A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

# Construction Methods

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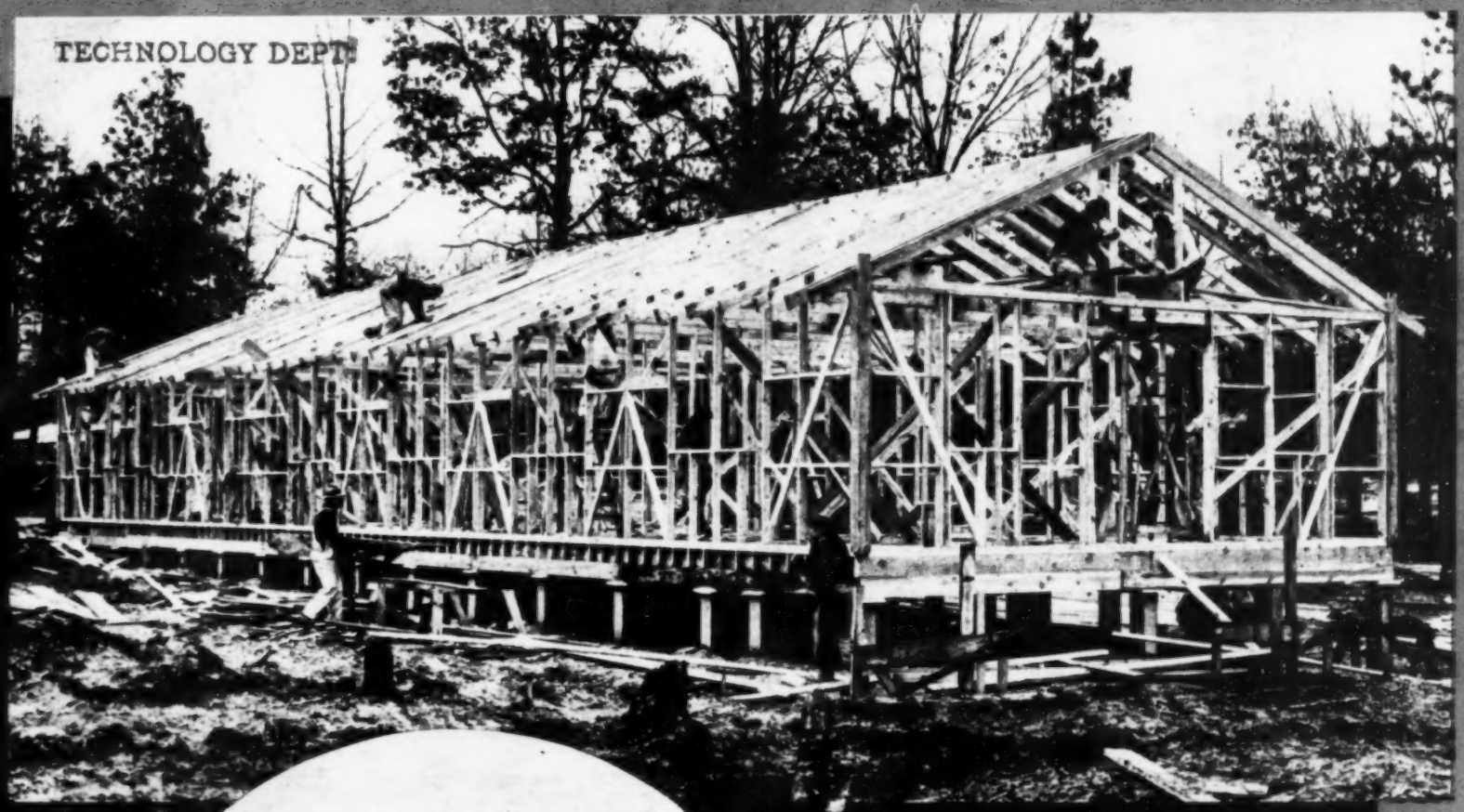

## FEBRUARY, 1941

CANTONMENT CONSTRUCTION AT CAMP MEADE

★

NAVY AIRPORT RUNWAYS

★

ROCK TUNNEL THROUGH CONTINENTAL DIVIDE

# Tarring Molds—A Routine Step at Inland

A VISITOR to the Inland Mills, observing the various stages in the making and processing of any product, will immediately be impressed by the thoroughness of attention to detail. He will learn that not the slightest factor, which will contribute to Inland quality and uniformity, is neglected.

For example, consider production of a heavy tonnage product such as plates. From mines and quarries to open hearth furnaces, raw materials are under perfect control. Carefully engineered furnaces are equipped with the latest types of control instruments, and open hearth practice has been standardized, resulting in heat-to-heat uniformity.

Inland molds are tarred to prevent ingot scabs. From the time the ingot is cast, surface and interior inspection is maintained on ingots, slabs, and the final plate product to eliminate any possible surface or internal defects. Surface defects on slabs are marked, and removed by chipping or scarfing before rolling into plate.

Combustion and temperature are under close control in the ingot soaking pits, and ingots are reduced at speeds regulated to assure correct rolling temperatures.

In the finishing mills, heating and rolling temperatures are closely watched by trained observers using special instruments. The result is absolute control of the physical properties of the plate. Finally, skilled inspectors carefully check the finished plate surfaces and dimensional tolerances.

The Inland practice of close attention to detail, plus metallurgical and physical laboratory control, assure steel products of highest quality and exceptional uniformity.

Inland produces plates to the following A.S.T.M. specifications:

A 7-39, Structural Steel for Bridges and Buildings

A 10-39, Plates for General Purposes

When specified, copper of not less than 0.2% can be provided in these specifications.

Other plate grades made by Inland include—Boiler, Fire-box, Hi-Steel and Structural Silicon Steels.

**SHEETS · STRIP · TIN PLATE · BARS · PLATES · FLOOR PLATES · STRUCTURALS · PILING · RAILS · TRACK ACCESSORIES · REINFORCING BARS**

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**INLAND STEEL CO.**

. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

# CURRENT JOBS

## .... and Who's Doing Them

### BUILDINGS

**Public**—At Charlestown, Ind., **E. I. duPont de Nemours & Co.,** of Wilmington, Del., will construct smokeless powder plant for approximately $74,000,000. At Wolfe Creek Ordnance plant, Milan, Tenn., **H. K. Ferguson Co.,** of Cleveland, Ohio, and **Oman Construction Co.,** of Nashville, will erect ammunition loading plant at cost of $14,000,000. Temporary housing and buildings at Fort Bragg, North Carolina, will be erected by **T. A. Loving Co.,** of Goldsboro, for $13,861,593 on cost-plus-fixed-fee basis. Contract for small arms ammunition plant in St. Louis, Mo., was awarded to **Fruco Construction Co.** and **Fruin-Colnon Contracting Co.,** of St. Louis, and **Massman Construction Co.,** of Kansas City, Mo., for $11,819,400 on cost-plus-fixed-fee basis. War department awarded contract for construction of anhydrous ammonia plant in Henderson, Ky., to **Solvay Process Co.,** of New York City, for $11,132,440 on cost-plus-fixed-fee-basis. **Trojan Powder Co.,** of Allentown, Pa., will construct and equip TNT and DNT plant in Sandusky, Ohio, for $10,725,000. Successful bidder for contract to construct bag-loading plant in Pulaski, Va., was **Hercules Powder Co.,** of Wilmington, Del., with price of $6,756,999.

Contract for housing project, comprising 1,400 units, at Coco Solo and Balboa, Canal Zone, went to **Leonard Construction Co.,** of Chicago, Ill., for $4,224,000 on cost-plus-fixed-fee basis. At Ordnance Works, Charlestown, Ind., the **Goodyear Tire & Rubber Co.,** Akron, Ohio, will construct a bag-loading plant for approximately $3,000,000. Barracks and officers' quarters at airport in Manchester, N. H., will be built by **Caye Construction Co., Inc.,** of Brooklyn, N. Y., for $2,000,000. Four warehouses at Columbus Army Reserve Depot in Columbus, Ohio, are under construction by **Corbetta Construction Co.,** of New York City, for $2,357,000. Temporary housing and general hospital for Fort Dix, N. J., will be erected by **J. A. J. Construction Co., Inc.,** of Brooklyn, N. Y., for $1,828,000. **Dolph-Bateson Construction Co.,** of Dallas, was awarded contract to build six warehouse buildings in San Antonio, Tex., for $1,079,000. **Reynolds Metals Co., Inc.,** of Richmond, Va., was awarded contract to build plant for manufacture and assembly of ordnance equipment at Macon, Ga., for $1,673,315. **Cummins Construction Corp.,** and **Riggs Distiller & Co., Inc.,** of Baltimore, received contract for plant facilities at Edgewood Arsenal and Aberdeen Proving Ground, Maryland, for $1,130,684 on cost-plus-fixed-fee basis.

**Industrial**—Republic Aviation Corp., of Farmingdale, N. Y., awarded contract for 1-story manufacturing building to **Turner Construction Co.,** of New York, at cost of $5,210,513. **Turner Construction Co.,** of New York, also received contract to build steel machine tool plant in Bridgeport, Conn., for $3,500,000. Power plant in Washington, D. C., is under way by **Stone & Webster Engineering Corp.,** of New York City, at estimated cost of $3,000,000. **Sutherland Construction Co., Ltd.,** of Montreal, Que., received contract for plant addition in Montreal, Quebec, Canada, for $1,000,000. In South Portland, Me., shipyard is under construction by **Sanders Engineering Co.,** of Portland, for $1,500,000. Successful bidder for contract for erection of manufacturing plant in Schenectady, N Y., was **United Engineers & Constructors, Inc.,** of Philadelphia, Pa., with price of $500,000.

### HEAVY CONSTRUCTION

At Galveston, Tex., contract for floating drydock was awarded to **Todd Galveston Dry Docks, Inc.,** of Galveston, for $2,254,343 on cost-plus-fixed-fee basis. Sewage treatment and disposal plant is under construction at Naval Air Station in Jacksonville, Fla., by **Geo. D. Auchter Co.** and **Duval Engineering & Contracting Co.,** of Jacksonville, and **Babson-Cook Co.,** of West Point, Ga., for $1,400,000. Ordnance proving ground, consisting of 120 buildings, at Madison, Ind., will be constructed by **J. L. Simmons Co., Inc.,** of Indianapolis, for $8,000,000 on cost-plus-fixed-fee basis. Contract for shipyard expansion in Chester, Pa., was awarded to **Sun Shipbuilding Co.,** of Chester, for $2,500,000. Penstocks for Shasta Dam in California, will be constructed by **Western Pipe & Steel Co.** of California, for $1,587,000. Shipbuilding pier in Fairfield, Md., was bid in by **Empire Construction Co.,** of Baltimore, for $750,000.

### HIGHWAYS AND BRIDGES

Among recent highway and bridge contract awards are the following: Illinois: $219,840 to **Valley Engineering Co.,** of St. Charles; $962,930 to **Midwest Construction & Asphalt Co.,** of Chicago; $226,536 to **T. C. Teutz,** of Paris. Ohio: $447,201 to **Bellefontaine Development Co.,** of Bellefontaine; $261,148 to **Lombardo Bros. Construction Co.,** of Cleveland. Texas: $679,315 to **Brown-Bellows-Columbia,** of Corpus Christi. Tennessee: $268,531 to **E. L. Traughber,** of Elkton, Ky.

Superstructure contract for toll bridge in Connecticut was bid in by **Harris Structural Steel Co.,** of New York, for $2,254,925, and contract for substructure was awarded to **A. I. Savin Construction Co.,** of East Hartford, for $1,486,995. Foundation and viaducts for grade separation in Brooklyn, N. Y., are under way by **B. Turecamo Contracting Co.,** local contractor, for $1,395,353. Low bidder for elevated highway in Brooklyn, N. Y., was **Corbetta Construction Co.,** of New York, with price of $1,178,819.


FEBRUARY, 1941

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# Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

ROBERT K. TOMLIN, Editor — A. E. PAXTON, Manager

*Editorial Staff:* Vincent B. Smith, Paul Wooton (Washington) N. A. Bowers (San Francisco) Nelle Fitzgerald

A McGRAW-HILL PUBLICATION


## The HOW of it

***For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:***


How **MOBILE PAY WAGON** distributed checks to thousands of employees on big munitions building contract. — p. 33

How **CENTRAL WOOD MILL** precut framing lumber for $14,000,000 army camp. — p. 36

How **HEAVY-DUTY SAW** dapped notches in rafters for barracks buildings. — p. 36

How **TERMITE SHIELDS** of sheet metal were placed to protect wood buildings. — p. 37

How **DIAGONAL WOOD SHEATHING** was applied to wall framing of two-story barracks building. — p. 38

How **ELEVATED RAILROAD STRUCTURE** of steel was razed by cutting with oxyacetylene torches. — p. 40

How **ROLLING SCAFFOLD** was utilized for demolishing steel structure with gas torches. — p. 40

How **CONCRETE GUN,** slung under jumbo in tunnel, was used to place concrete lining. — p. 44

How **HIGH SCALING** of canyon walls at damsite was done from special scaffolds. — p. 44

How **CANVAS PIPE** carried air for ventilating tunnel heading. — p. 45

How **STEEL FORMS** for tunnel lining in 23-ft. bore were carried on wide-gage jumbo. — p. 45

How **PREFABRICATED SPANS** were set to replace old railroad bridges. — p. 47

How **AIRPORT RUNWAYS** of asphalt and concrete were built at Navy base. — p. 48

How **SELF-PROPELLED FINISHING MACHINE** handled hot asphalt mix for airport runways. — p. 48

How **BRICK PAVEMENT** on concrete base was laid for large street widening project. — p. 50

How **SPECIAL SCREEDS** struck off concrete base between rails for brick pavement. — p. 54

How **TIMBER FALSEWORK** aided erection of steel girders for 270-ft. railroad bridge span. — p. 56

How **VIBRATING SCREEDS** improved concrete pavement finish. — p. 56

How **DAMPPROOFING** was applied to walls of buildings in mass housing project. — p. 57

How **RAISED WHITE BARS** on pavement aided control of traffic. — p. 57

How **SLOPE TRIMMER** smoothed surface of dam embankment. — p. 57

How **SMALL BORE TUNNEL** in rock was driven through Continental Divide. — p. 58

How **TUNNEL MUCK** was loaded by air-powered machine in rock tunnel. — p. 58



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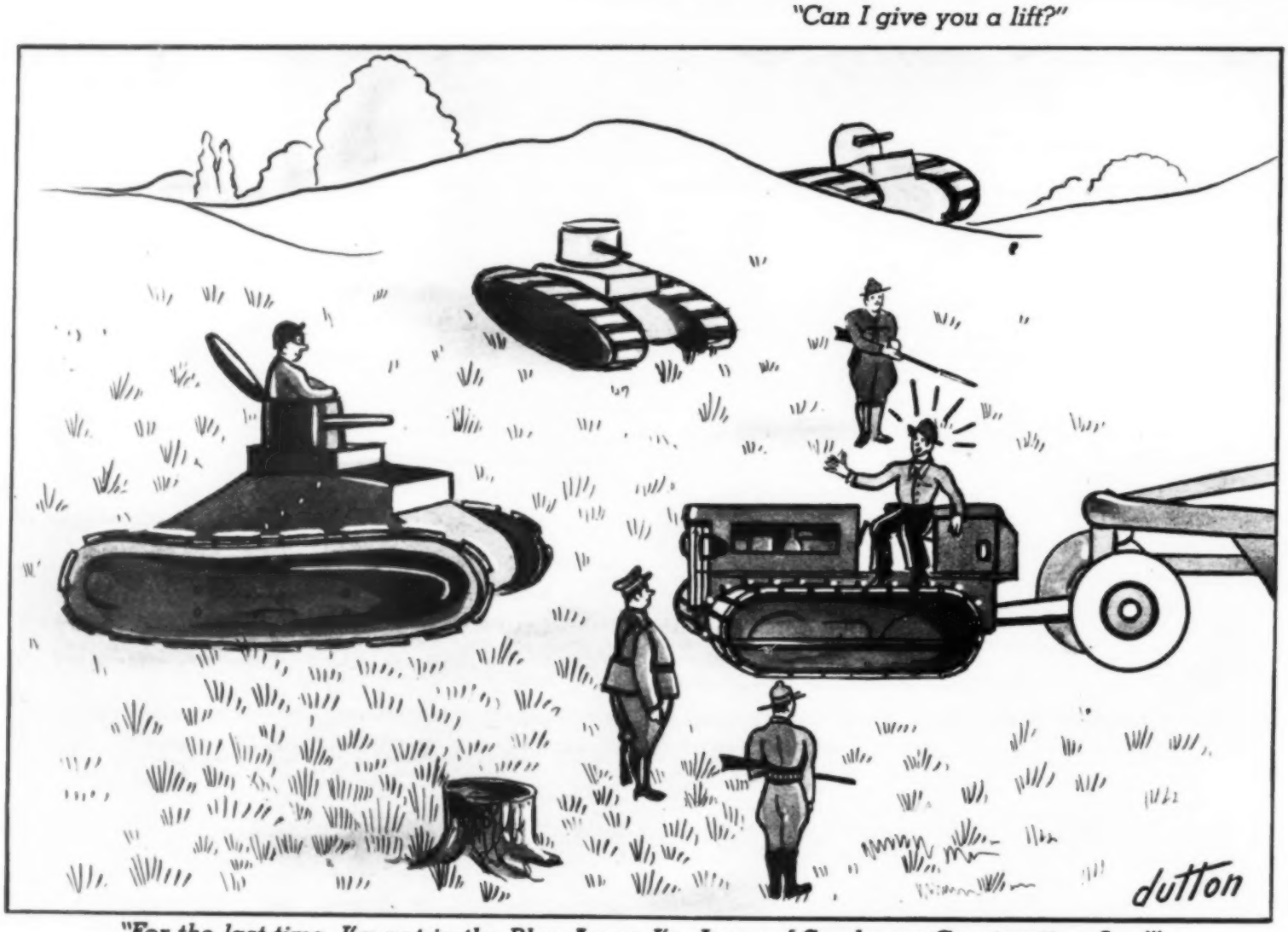
# THE JOB JESTER

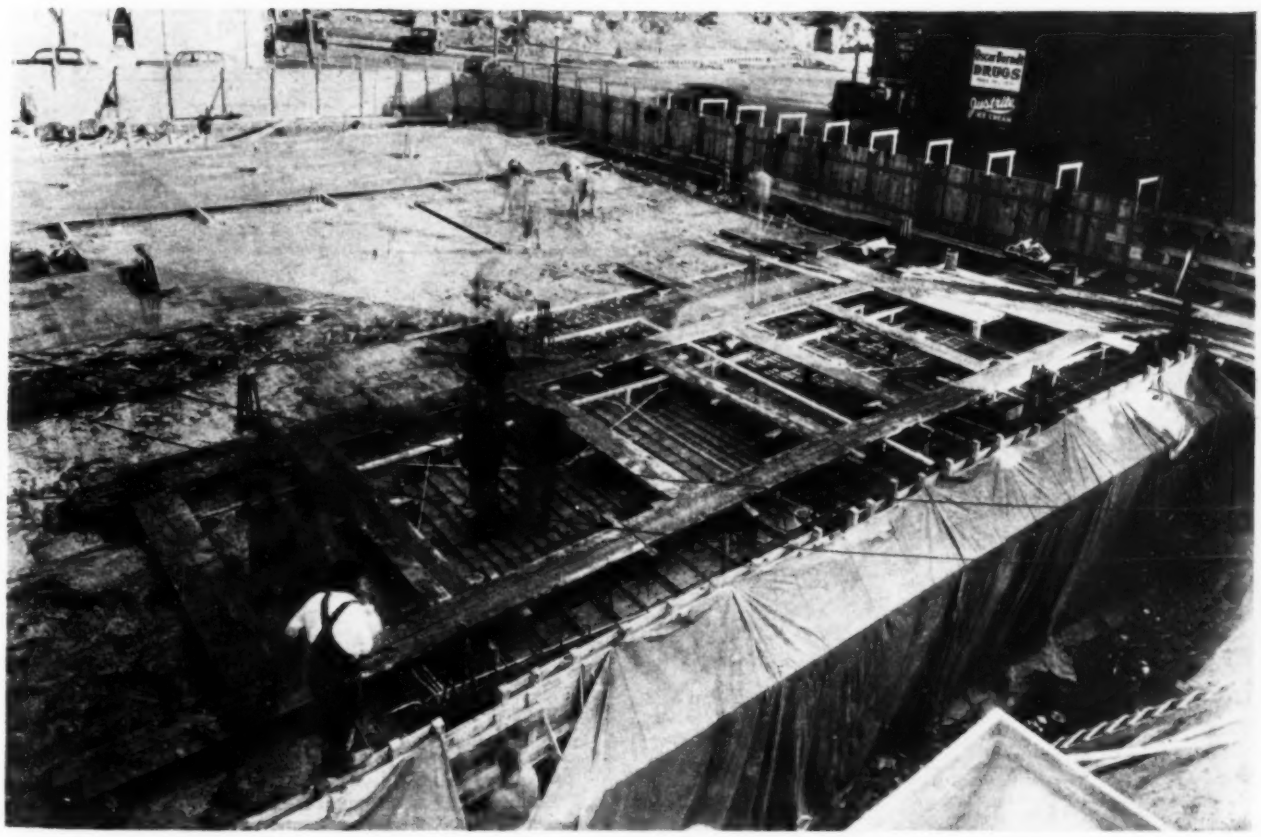
CARTOONS DRAWN FOR CONSTRUCTION METHODS

*"Can I give you a lift?"*




*"For the last time, I'm not in the Blue Army; I'm Jones of Snodgrass Construction, Inc.!"*

# 'Incor' Saved $2.01
## PER CU. YD. OF CONCRETE



### $1092 NET SAVING ON HEAT-PROTECTION ALONE, ON 2-STORY WINTER-BUILT STRUCTURE

THIS winter, on vital defense projects, 'Incor' 24-Hour Cement is speeding construction—on summer schedules, at minimum costs. Typical 'Incor' performance:

Concreting on 2-story Southwestern Bell Telephone Co. Building, St. Joseph, Mo., started last December. An admixture had been specified, but Rinehart Construction Co., St. Louis, Mo., contractor, found that 'Incor' made its use unnecessary. Heated concrete was promptly protected; concreting proceeded, even at sub-freezing temperatures. 'Incor' saved:

| | |
|---|---|
| (1) 21 days' heat-protection @ $52 a day | $1092 |
| (2) Cost of admixture on 800 cu. yd. of concrete | 440 |
| (3) 14 days' overhead @ $48.33 per day | 676 |
| Total 'Incor' Saving | $2208 |
| Less extra cost of 'Incor' | 600 |
| Net Saving | $1608 |

*Net 'Incor' Saving: $2.01 per cu. yd. of concrete placed.*

Use 'Incor'* this winter—you will find it pays well. Write for copy of "Cold Weather Concreting." Lone Star Cement Corporation, Room 2262, 342 Madison Avenue, New York. *Reg. U. S. Pat. Off.

**QUALITY PAYS . . . INSIST ON 'INCOR'**

'Incor' 24-HOUR Cement means just what the name says—dependable 24-HOUR service strength. Plus long-time durability, proved by 13-year performance. Quality pays—because better cement makes better concrete.

**LONE STAR CEMENT CORPORATION**

**MAKERS OF LONE STAR CEMENT . . . 'INCOR' 24-HOUR CEMENT**

# TRAXCAVATOR*

# MASTER OF ALL JOBS!

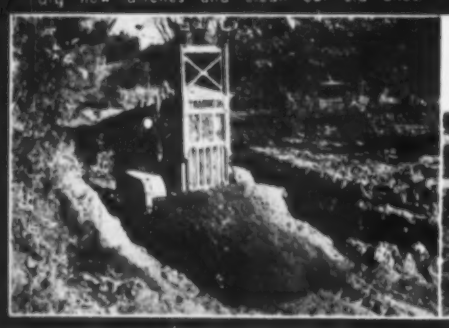
**DIGGING**—The full tractor drawbar horsepower behind the bucket enables it to dig the toughest soils shale, caliche, frost etc.

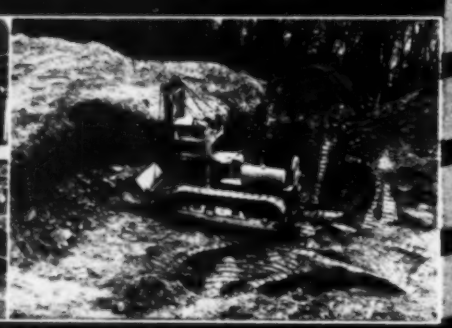
**LOADING**—TRAXCAVATORS are particularly useful in close quarters as they are compact—make short turns, and operate easily.

**DITCHING**—TRAXCAVATORS equipped with bucket or bulldozer blade, efficiently dig new ditches and clean out old ones.

**CLEAN-UP**—TRAXCAVATORS are without equal for cleaning up and loading trash, debris etc. as on the housing site pictured.

**BASEMENT EXCAVATING**—Contractors prefer and use TRAXCAVATORS for all kinds of excavating from cellars to subways.





**"TRAXCAVATORS"– the heavy-duty tractor excavators – not only dig but load, grade, carry, bulldoze, and spread; in fact, there is no limit to their usefulness on any project. Mounted on "Caterpillar" track-type tractors they have the speed, power and traction to operate in toughest conditions. "TRAXCAVATORS" are furnished in three models with a wide variety of bucket sizes, extra equipment and attachments to make them the MASTER OF ALL JOBS. Sold and serviced by "Caterpillar" dealers everywhere. Further information and completely illustrated catalog upon request.**

**TRACKSON COMPANY, Milwaukee, Wis., U.S.A.**

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EXCAVATES • LOADS
GRADES • STRIPS
BULLDOZES • LEVELS
CLEARS LAND • PULLS
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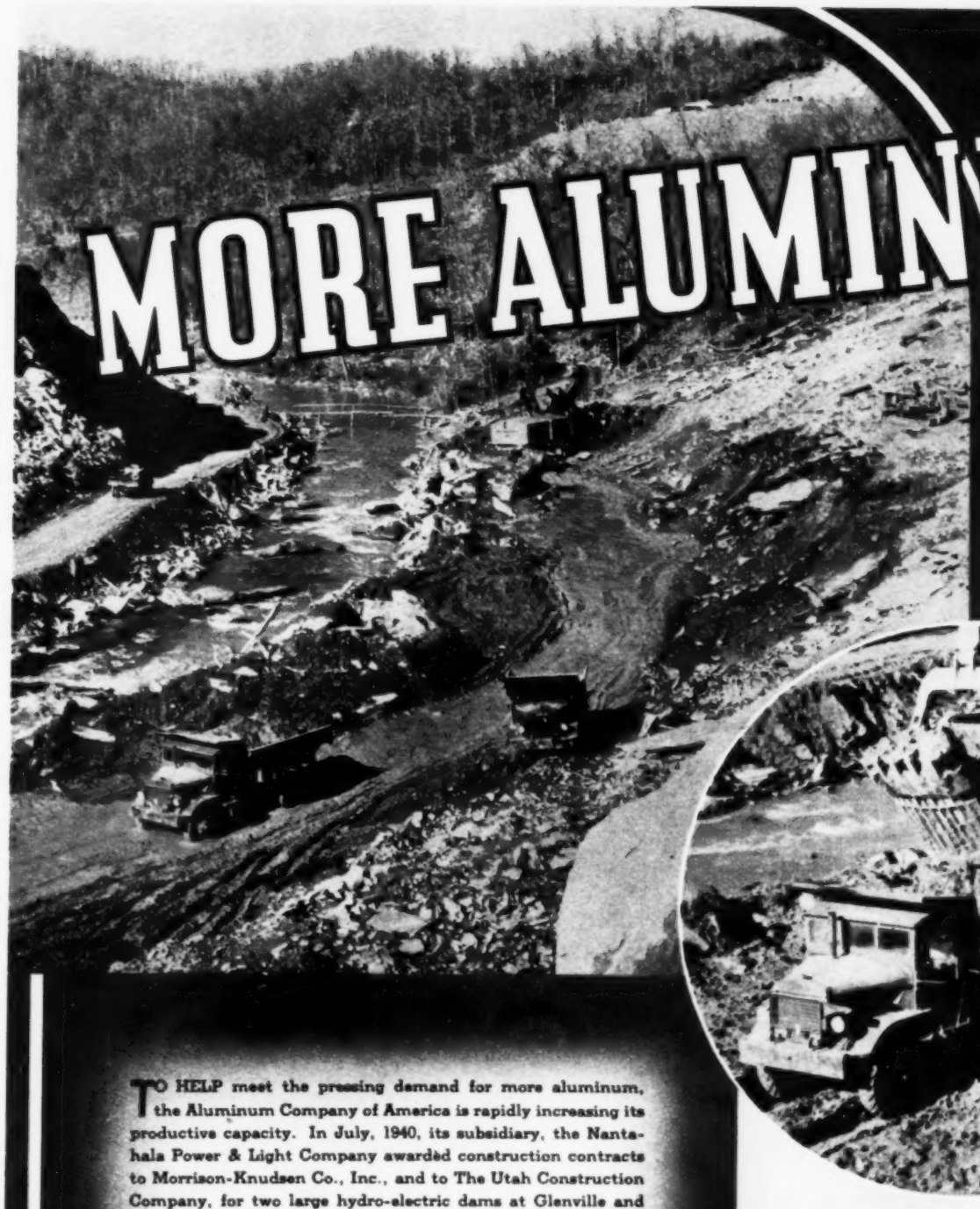
DIGS • REMOVES SNOW
SPREADS • DITCHES

# TRAXCAVATORS ARE PROFIT-MAKER

# MORE ALUMINUM!



TO HELP meet the pressing demand for more aluminum, the Aluminum Company of America is rapidly increasing its productive capacity. In July, 1940, its subsidiary, the Nantahala Power & Light Company awarded construction contracts to Morrison-Knudsen Co., Inc., and to The Utah Construction Company, for two large hydro-electric dams at Glenville and Nantahala, N. C., which will serve additional Alcoa plant facilities. Work on the projects was started immediately and is proceeding with all possible speed.

It is significant that Euclids were selected to complete both of these difficult jobs in record time. . . . Morrison-Knudsen Co., Inc., is using ten Model F 15-Ton Rear-Dump EUCLIDS; The Utah Construction Company is using fourteen EUCLIDS of the same model and size.

The outstanding performance of Euclids on these Alcoa dams is typical of the leading part which Euclids are playing in the speedy and economical completion of vitally important private and public enterprises throughout North and South America.

**THE EUCLID ROAD MACHINERY CO.**
**Cleveland, Ohio**

**EUCLID**

**SELF-POWERED**
EARTH • ROCK • COAL • ORE
**HAULING EQUIPMENT**
And — CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS

EUCLID
THE PIONEER

ALTER EGO: Literally "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

**ALTER EGO:** I know you have your doubts about the need for *two* welding controls. But that's a good omen.

*Good? In what way?*

**ALTER EGO:** Well, to *believe* with certainty, we all must begin with modest doubts. Then, as we kick over the doubts one by one, the certainty is reinforced.

*Then, if I want to make a sound conclusion, it's up to me to start kicking over a few doubts.*

**ALTER EGO:** Right. And there's an army of veteran Welders that'll help you get rid of your D. T.'s.

• •

LINCOLN SUGGESTS: Ask the experienced welders how Dual Continuous Control assures *greater benefits from welding*. They'll tell you that Dual Continuous Control is the only means of varying both the TYPE of arc and the arc INTENSITY. This flexibility enables them to get the EXACT welding arc for maximum quality and maximum speed on every job. The value of this welder control—to you—is explained fully in "The New Arc Welding Technique," Bulletin 412. (Gratis on request.)

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THE LINCOLN ELECTRIC COMPANY
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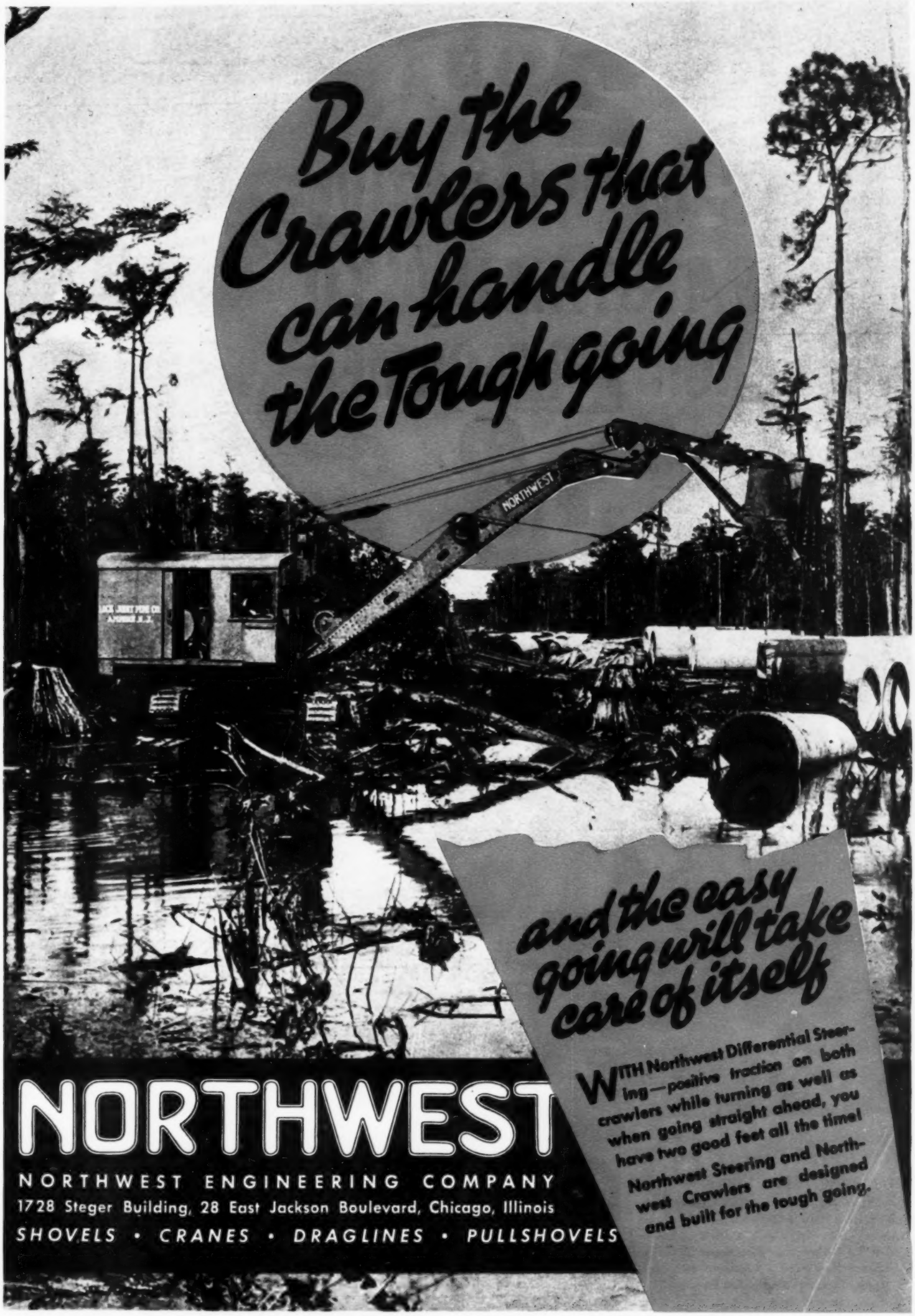
Authoritative Information on Design • Production • Welding Equipment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and the easy going will take care of itself
WITH Northwest Differential Steering—positive traction on both crawlers while turning as well as when going straight ahead, you have two good feet all the time! Northwest Steering and Northwest Crawlers are designed and built for the tough going.
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# 2
# KINDS OF WIRE GIVE *EXTRA* STAMINA TO MONARCH *PRE*FORMED

**"THESE EXTRA-TOUGH INNER WIRES—**
inside every strand are improved plow steel. They are unusually pliable and are designed to fight internal fatigue caused by continuous bending. These flexible and tough wires provide the reserve strength of the rope."

**"THESE EXTRA-TOUGH OUTER WIRES—**
in every Monarch Whyte Strand Rope are also improved plow steel specially drawn for outside service. They are made to take the worst punishment wire ropes can be subjected to—they resist corrosion, dragging, jerking, abuse and abrasion."

**AROUND BOTH WIRES AND STRANDS** is a specially formulated Macwhyte internal lubricant. It protects the unseen, inside wires against damaging and costly internal friction. Ask your Macwhyte distributor about Monarch Whyte Strand PREformed. Field proved on equipment like yours, it's the CORRECT rope for your job.

**PENNSYLVANIA'S FAMED TURNPIKE,** now history, gave Monarch Whyte Strand PREformed many opportunities to prove again it's a "tough" rope to beat. Strong, flexible, long lasting, it lowered contractors' costs, reduced shutdowns to minimum.

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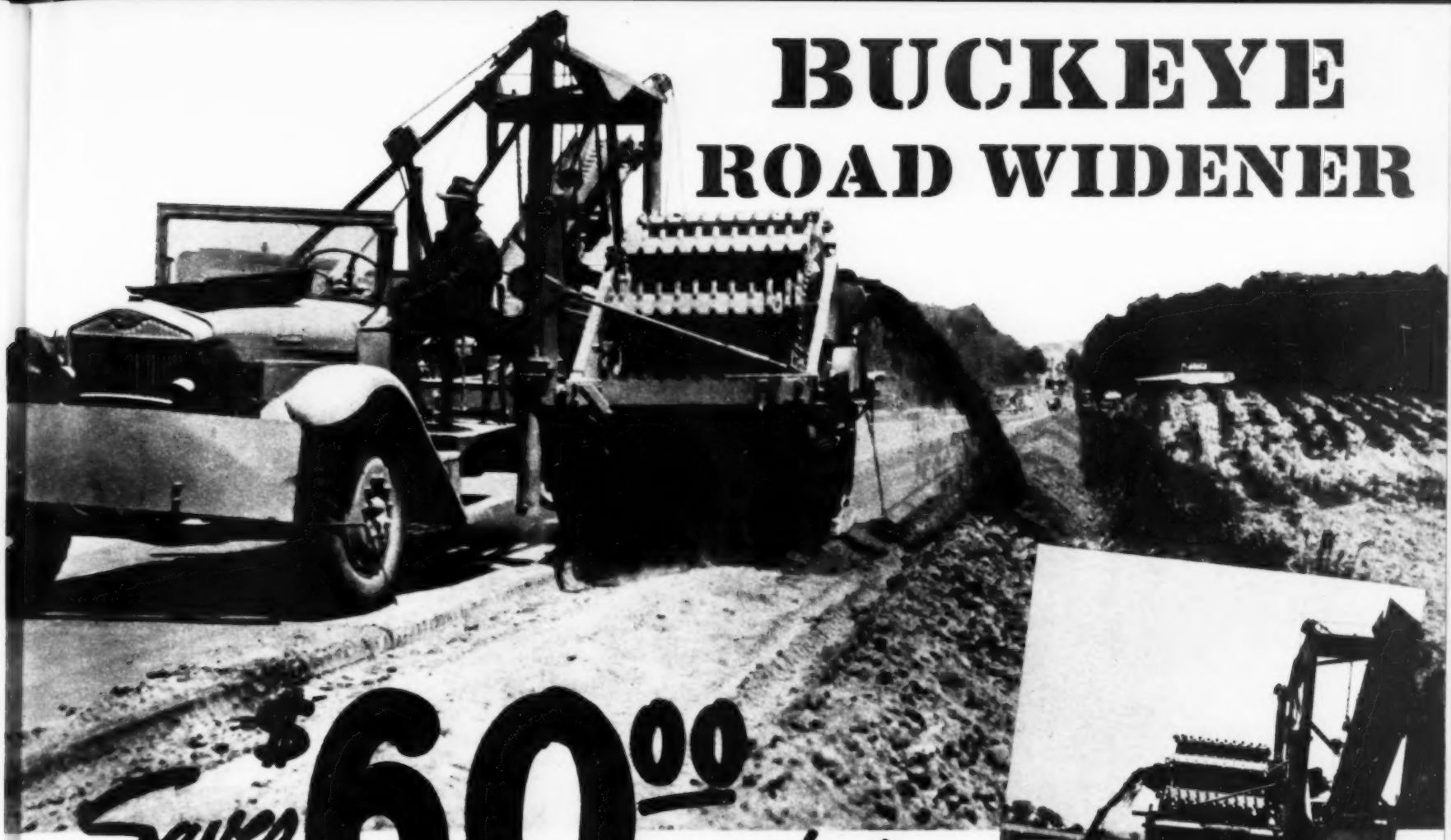
TESTED INTERNALLY LUBRICATED PROVED

*The correct ropes for your equipment*

**PRE-FORMED FOR BEST PERFORMANCE**

# BUCKEYE
# ROAD WIDENER



## Saves $60.00 per day
## on South Carolina job!

### JOB FACTS:

**CONTRACT:** Four foot widening on one side of Highway 117 in South Carolina between Calypso and Dudley.

**CONTRACTOR:** Wm. F. Bowe, Jr., Augusta, Ga.

**METHOD OF WIDENING:** Subgrade trench dug with a BUCKEYE Model 16-R-4 Highway Widening Machine. Concrete poured between existing slab and 8" steel forms.

**DIMENSIONS OF WIDENING TRENCH:** 4'-9" wide from edge of existing slab, to allow 4' widening and 9" for setting forms. 8 inches deep: 7" for slab and an additional inch below finished finegrade for form line.

**SPEED OF TRENCHING:** Widening trench cut to specifications at the rate of a mile per day!

**DOLLAR SAVING:** $60.00 per day saved over previous method of trenching due to speed and accuracy of Buckeye machine!

**SAVING ON CONCRETE:** Excess of aggregate on 3 miles of work done prior to use of Buckeye Road Widener was 8%. Ability of machine to cut to accurate depth reduced this to 2%!

**OTHER ADVANTAGES:** Buckeye Widener served as "spark plug" or pace setter for entire job.

**Go out and look for road widening jobs this year. You can bid low and make a good profit if you base your figures on using a Buckeye Road Widener for the job! Write to Buckeye today and ask for complete information and a bulletin on these money-making machines. BUCKEYE TRACTION DITCHER CO., Findlay, Ohio.**

## Built by Buckeye

# A tight foundation despite 50" of water

On the Goshen High School job the contractor was confronted not only with freezing weather, but with as much as 50" of water in the foundation trenches. By using Lehigh Early Strength Cement, however, the concrete cured so fast that a tight foundation was obtained.

The special advantages from using Lehigh Early Strength Cement will vary from job to job. Supt. Shaw of the J. A. J. Construction Co. was, for instance, especially pleased with the way Lehigh Early Strength Cement produced concrete for beams and columns so dense as to need little finishing; also with the clean bores obtained when preparing holes for fixtures.

What every construction man should remember is that Lehigh Early Strength Cement makes better, denser concrete in one-third to one-fifth the usual time. The natural result of this speed is lower forms cost, better coordinated construction schedules, less danger of frost damage, lower cost of heat protection —besides the special advantages that crop up from job to job.

Winter or summer Lehigh Early Strength Cement will save you time and money. The Lehigh Service Department will gladly answer inquiries.

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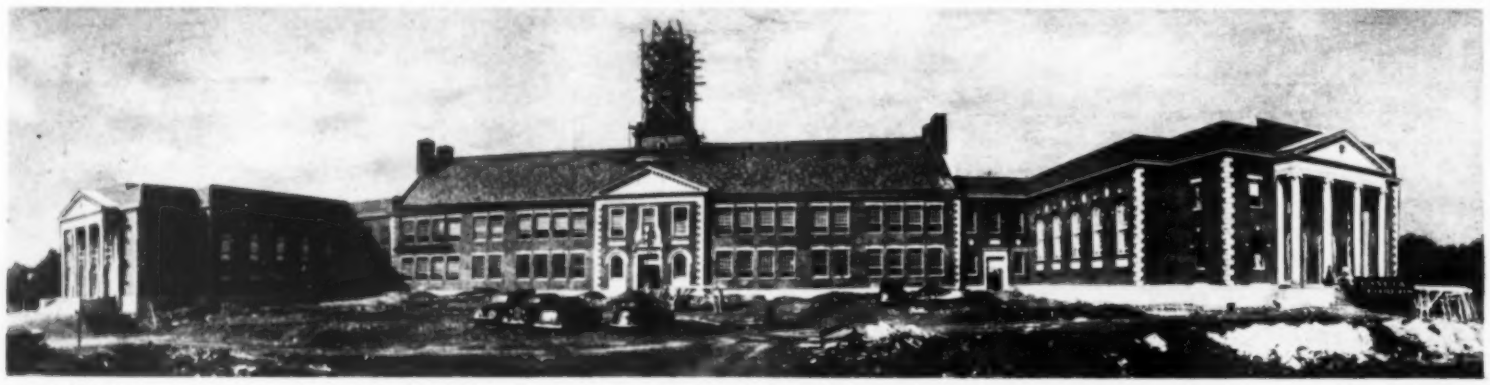
**EARLY STRENGTH CEMENT**

*for service strength concrete in a hurry!*

**LEHIGH PORTLAND CEMENT COMPANY**
Allentown, Pa. Chicago, Ill. Spokane, Wash.



HIGH SCHOOL: Goshen, N. Y. • ARCHITECT: Robert L. Graham • CONTRACTOR: J. A. J. Construction Co. • DEALER: Sayer Lumber Co., Goshen, N. Y.

# HEIL DIG-N-CARRY SCRAPERS

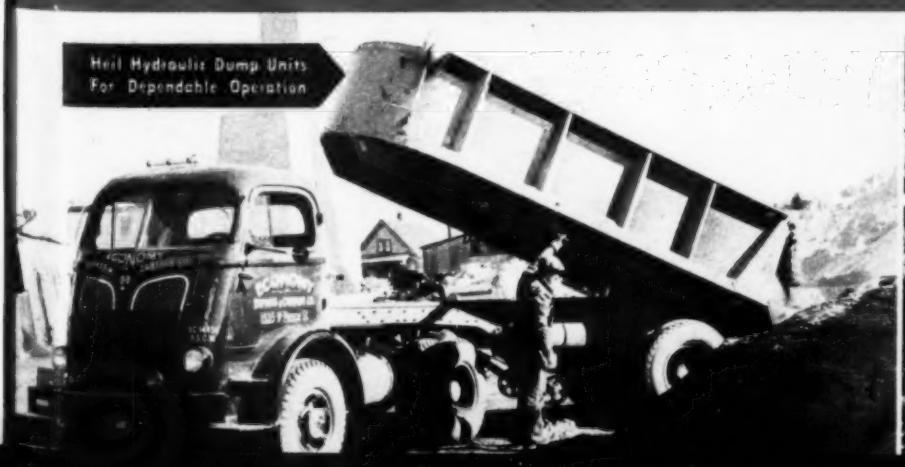
# load, dump, slope and grade FASTER-BETTER-AT LESS COST

## OPERATOR'S STATEMENTS PROVE ALL-PURPOSE PERFORMANCE OF HEIL DIG-N-CARRY SCRAPERS

"Best dirt hauler out — fast and economical. Can depend on good work. We can slope and grade better than other units on the job." That's what the tractor operator on a big-time construction job says about the operation of Heil Dig-N-Carry Scrapers . . . Dependable, efficient and economical, Heil Dig-N-Carry Scrapers are all-purpose tractor tools for digging, filling, sloping or grading . . . On many jobs Heil Scraper equipment saves the expense of maintaining auxiliary grader or bulldozer equipment, because its speedy, flexible operation enables the scraper operator to do a better job — faster and at less cost . . . Write, wire or phone for Heil recommendations before you buy.

# THE HEIL CO.

MILWAUKEE, WISCONSIN • HILLSIDE, NEW JERSEY



# IT'S 75 TO 5

## ON SANTEE-COOPER . . .

### *IN FAVOR OF "CATERPILLAR" DIESELS!*

THERE'S no getting around it . . . when 13 contractors sharing a single job depend on one line of equipment for practically all their power, that equipment must have something you can use in your business!

And here's what it's got:

Economy . . . better-than-average Diesel-economy, because "Caterpillar" Diesels operate efficiently on the low-priced, non-premium fuels!

Stamina . . . that comes from "Caterpillar" quality manufacture, including "Hi-Electro" hardening for track roller-rims and shafts, track-pins, cylinder-liners, crankshaft: parts that must fight the most wear!

Power . . . to swing the big loads—whether they're stationary loads or the kind of loads that call for bull-dozers, wagons, scrapers, rippers, tampers, discs, or any other type of drawn, pushed or mounted equipment!

These are some of the reasons that out of 80 track-type tractors on the Santee-Cooper Project in South Carolina, 75 are "Caterpillar" Diesel Tractors!

In addition, 6 of the 9 motor graders on the job are "Caterpillar" Diesel Motor Graders. And 15 "Caterpillar" Diesel Engines light the night work . . . supply air . . . power shovels . . . and handle other stationary duties!

Look over the fuel-costs and work-schedules of some of this "Caterpillar" Diesel equipment which is illustrated here . . . and see if you don't line up with these 13 Santee-Cooper contractors!

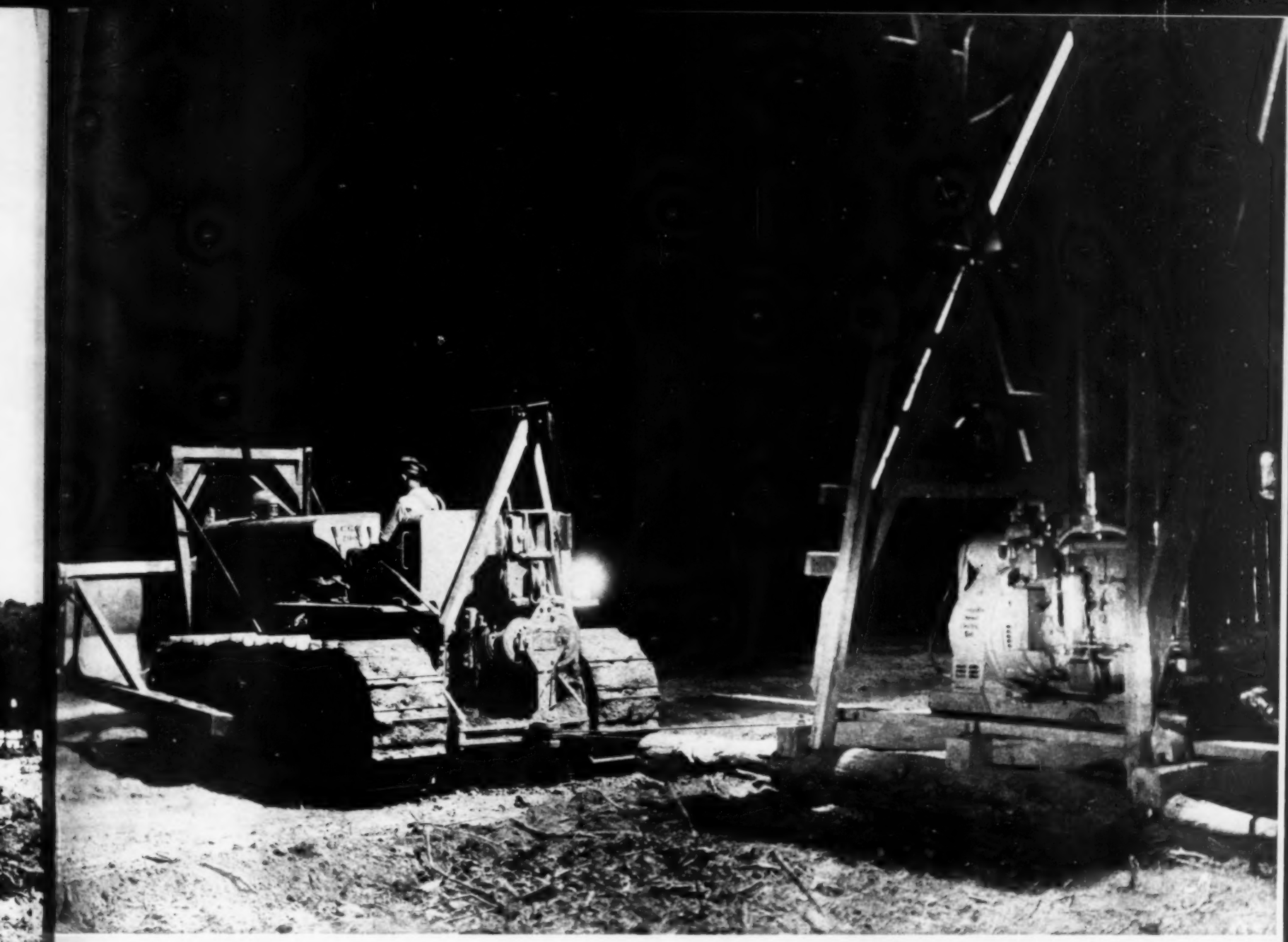
CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

THE SANTEE-COOPER CONTRACTORS—

Atlantic Dredging & Construction Co. • Central Engineering Co. • Cornell-Young Co. • Fuller & Britton • L. E. Harris • Kile Killman • Ross Wills
Robert Lee, Inc. • McCarthy Improvement Co. • McWilliams Dredging Co. • Sammons-Robertson Co. • W. C. Shepherd • J. A. Terteling & Sons

# CATERPILLAR *Diesel*

ENGINES AND ELECTRIC SETS • TRACK-TYPE TRACTORS • ROAD MACHINERY



◀ McWilliams Dredging Co., New Orleans, La., turns over a pit-leveling job — on the Santee-Cooper Project — to a "Caterpillar" Diesel D7 Tractor equipped with a LaPlant-Choate bulldozer. The tractor works 8 hours a day on only 3 gallons of 8c fuel an hour.

▲ A 34-15 "Caterpillar" Diesel-Electric Set furnishing light for night-work at the South Dike, near Macbeth, South Carolina, on the Santee-Cooper Project. Mounted on skids, it is being towed by a "Caterpillar" Diesel D8 Tractor. Owned by Fuller & Britton. Most owners report that these popular-size "Caterpillar" Diesel-Electric Sets (available from 15 to 90 kilowatts) generate current for around 1c per kilowatt-hour.

▲ Equipped with a LeTourneau Angledozer, this "Caterpillar" Diesel D7 Tractor—owned by Robert Lee, Inc. —works on the Santee-Cooper Project. It is shown clearing trees from a diversion canal and piling them into windbreaks.

▲ "Caterpillar" Diesel D11000 Engine powering a Sullivan portable compressor to supply air for digging through rock near Bonneau, S. C., on the Santee-Cooper Project. Working 16 hours a day. Owned by J. A. Terteling & Sons.

▲ One of the Sammons-Robertson Company's 15 "Caterpillar" Diesel D8 Tractors. This is at Pinopolis Dam. Hauling two LaPlant-Choate wagons, each with an average load of 17 yards, the tractor makes 2½ trips an hour. Works 21 hours a day.

# OSGOOD

On the job near Hometown, Pa. The Contractor is D. A. Kessler Construction Co., Inc., of Mt. Carmel, Pa. The shovel on the left is an OSGOOD Model 900, on the right an OSGOOD Model 900 High Lift, both with 2-cu. yd. dippers.

## SPEAKING OF ROCK—

there is plenty of it here, and yielding very nicely to the smooth, effortless control on these OSGOOD Model 900s.

Did you know OSGOODS have been moving rock for hundreds of satisfied owners, ever since Count de Lesseps first tried to build the Panama Canal in 1882-83?

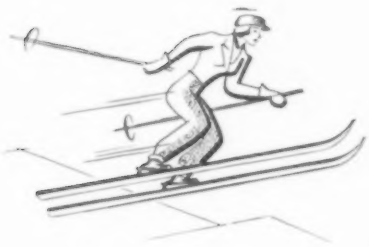
Let us send you our new Catalogs. They tell all about OSGOOD.

The **GENERAL** EXCAVATOR CO.
Sizes: ⅜ - ½ - ⅝ - ¾
DIESEL - GAS - ELECTRIC
Associated with THE OSGOOD CO.

The **HERCULES** COMPANY
HERCULES *IRONEROLLERS*
6 to 12 Tons
Diesel or Gasoline
Associated with THE OSGOOD CO.

**OSGOOD**
Sizes:
½ to 2½ Cu. Yd.
Diesel - Oil - Gas - Electric
OSGOOD MARION OHIO U.S.A. GENERAL HERCULES
SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted
THE OSGOOD COMPANY, Marion, Ohio

# ANNOUNCING . . .



# a Year 'Round

# wheel bearing lubricant

After
34,000 MILES
Unretouched photos of wheel bearings lubricated with Texaco Marfak—Heavy Duty. Note that all rollers are well covered with lubricant, despite 8 months' hard use, with hub temperatures averaging upwards of 250°F.

SEVERELY service-tested for the past year by well-known fleet operators, a single grade of a new wheel bearing lubricant has shown astonishing lubricating efficiency . . . in sizzling summer heat and sub-zero cold.

The name of this superior new product is *TEXACO MARFAK HEAVY DUTY.*

Texaco Marfak Heavy Duty *stays in wheel bearings,* despite the high hub temperatures, even of electric trolley buses where engine compression is not used for braking.

This newest Marfak gives thousands of extra miles of service. You repack less frequently, thus effecting desirable savings. *No seasonal changes necessary.*

Because Texaco Lubricants have proved their ability to *save money* for busy bus operators—

***MORE BUSES, MORE BUS LINES, MORE BUS-MILES ARE LUBRICATED WITH TEXACO THAN WITH ANY OTHER BRAND***

The outstanding performance that has made Texaco preferred in the bus field has also made it preferred in the fields listed in the panel.

These buyers are enjoying many benefits. You, too, will find important advantages when you use Texaco Lubricants and Fuels.

A Texaco Lubrication Engineer will gladly cooperate in making savings in your fleet. Phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

## THEY PREFER TEXACO

- ★ More tourists use Texaco *Fire-Chief* Gasoline than any other brand.
- ★ More scheduled airline mileage within the U.S. and to other countries is flown with Texaco than with any other brand.
- ★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.
- ★ More stationary Diesel horsepower in the U.S. is lubricated with Texaco than with any other brand.
- ★ More Diesel horsepower on streamlined trains in the U.S. is lubricated with Texaco than with all other brands combined.
- ★ More railroad rolling equipment in the U. S. is lubricated with Texaco than with any other brand.

TEXACO DEALERS INVITE YOU TO ENJOY

**FRED ALLEN**
in a full-hour program every Wednesday night. CBS, 9:00 E.S.T., 8:00 C.S.T., 10:00 M.S.T., 9:00 P.S.T.

**METROPOLITAN OPERA**
every Saturday afternoon, NBC. See local newspaper for time and station.

# TEXACO Lubricants and Fuels

## FOR ALL CONTRACTORS' EQUIPMENT

# Speeds Up Concrete Pouring on Big National Projects

A Battery of Smith 4-yard Front End Charging Tilters—the largest mixers in the world. These machines were recently purchased for the TVA Cherokee Dam Project.

## The BIG Jobs Are Poured by SMITHS

From coast to coast, and in many foreign countries Smith Mixers have been an important factor in building the world's greatest concrete structures. The above map shows only a few of the more outstanding projects. Hundreds more could be listed. On every one of these punishing two-, three-, and even four-year jobs, Smith Mixers have repeatedly stood this acid test, definitely proving their ability to stand the gaff and come back for more punishment.

**PRE-MIX PLANTS**—Smith Tilting Mixers and Smith-Mobile Agitators are proving a winning combination for mixing and delivering uniform concrete. Write for complete facts.

## New, Improved Features Make the SMITH TILTER even BETTER and FASTER than Ever

For forty years, the Smith Tilting Mixer has set the pace for concrete mixers, earning a well-deserved reputation for fast loading, thorough "End-to-Center" mixing action, rapid "Tilt and Pour" discharge and absolute dependability.

Today — the new Smith Tilter continues with that same basic design but with many additional refinements that result in even greater speed and operating efficiency. The new features include:

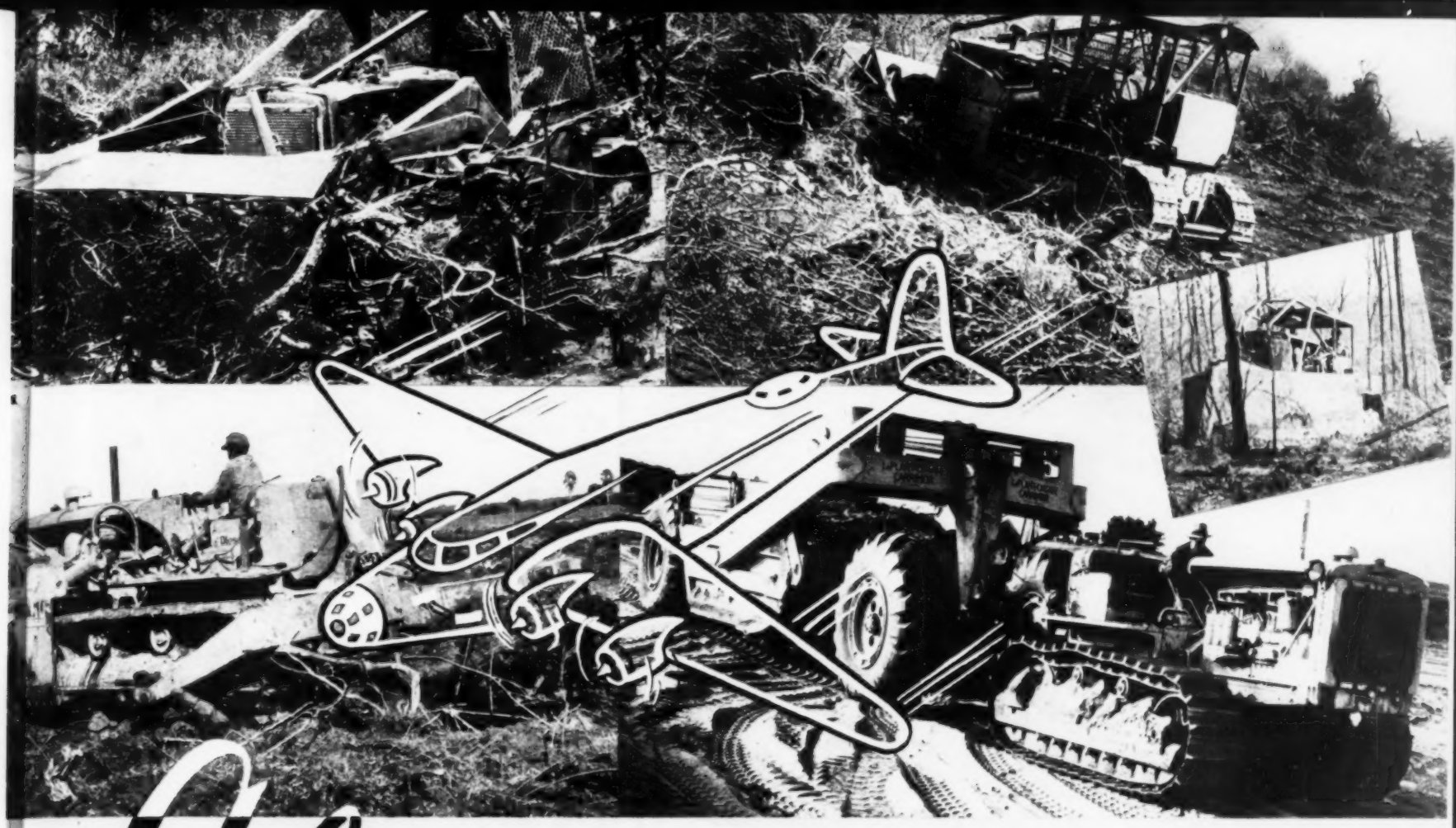
**Fast, automatically tilting feed chute—All-welded, steel tilting frame — Machine cut reduction gears, running in oil — Multiple V-Belt drive — Anti-friction bearings throughout — High carbon steel drum ring gear and pinion, both with machine cut teeth — Adjustable guide rollers with tapered face.**

If you're looking for the fastest, most modern concrete mixers, be sure to investigate SMITH TILTERS. All sizes available, up to 4-yards per batch. Write for catalog.

**The T. L. SMITH CO., 2851 N. 32nd St., Milwaukee, Wis., U.S.A.**

# SMITH MIXERS

USED ON THE WORLD'S GREATEST CONCRETE PROJECTS



# *Clear the way*

## FOR 200 NEW AIRPORTS

### LaPLANT-CHOATE LAND CLEARING EQUIPMENT ASSURES SPEED, ECONOMY, FLEXIBILITY

UNCLE SAM has set aside approximately $100,000,000 to construct more than two hundred new airports. And the alert contractors who do these jobs will be required to combine *speed* with thoroughness. More than ever before, the right type of equipment for each phase of the job is vitally important.

These jobs won't be easy. Most of the work will be done where no landing field existed before. Much of the land will have to be cleared of trees, brush and undergrowth . . . stumps will have to be removed . . . debris raked into piles and burned—All this *before* the leveling, grading and finishing.

Wherever the job may be . . . no matter how tough it is, you can depend on LaPlant-Choate Land Clearing and Earth Moving tools . . . mounted on "Caterpillar" Track-type Tractors . . . to "clear the way" profitably on airport construction jobs. Treedozers, Brushcutters, Root Cutters and Rake-type Blades "clear the way" and "Carrimor" scrapers follow to complete the job. Yes, they have been field-tested by successful contractors the world over.

And these tools are interchangeable on the same tractor if you desire. Hydraulic controls help make this interchangeability simple . . . it takes only a few minutes to remove one tool and hook up another, utilizing the same Hydraulic Control unit. (An extra valve is needed for the Brushcutter.) Such features as positive down pressure for digging or pushing . . . rigid locking in desired position . . . and fast, finger-tip operation, not found in other similar equipment, add up to faster, better work—at a *profit!* Write or wire today for Free literature and full details.

## LA PLANT-CHOATE MANUFACTURING CO. Inc.

CEDAR RAPIDS, IOWA.

# *In these days . . .*

## would you try a twist drill with 50% longer life?

Surely in these critical days you would try a different drill if you could be sure it would last 25% or even 10% longer. And you would apply the same logic to wire rope if you knew that there is really a difference in ropes. There is, and the name of the rope to ask for is

## HAZARD LAY-SET *Preformed*

In comparison with non-preformed ropes, LAY-SET Preformed often makes astonishing records.

In the first place, it *lasts longer* because of its extreme resistance to fatigue. That eliminates frequent shutdowns for replacement, thus saving priceless time. This means faster and more consistent production.

In the second place, it is *easier and safer for workmen* to handle. It is disinclined to kink. It's relaxed and tractable like a well-trained saddle horse as compared with a bucking bronco.

These characteristics are preformed into LAY-SET Wire Rope at the mill, and they account for its ability to withstand hard work for a longer time at a lower cost—and with greater safety to men and equipment.

See for yourself by ordering Hazard LAY-SET Preformed Green Strand and keeping a comparative record of its performance. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

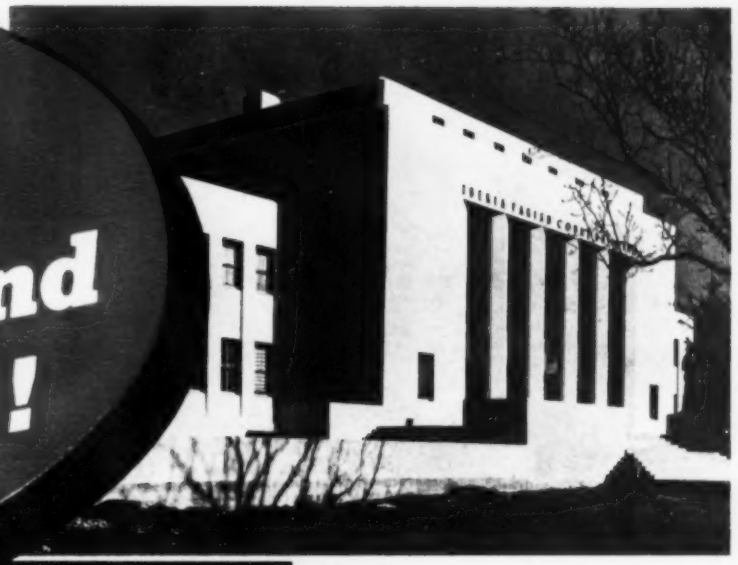
**HAZARD WIRE ROPE DIVISION** • WILKES-BARRE, PENNSYLVANIA

*Established 1846*

**AMERICAN CHAIN & CABLE COMPANY, Inc.**

District Offices: New York, Chicago, Philadelphia, Pittsburgh, Fort Worth, San Francisco, Denver, Los Angeles, Atlanta, Tacoma

# PLYFORM scores over and over again!



## Gives smoother surfaces at lower cost and in less time!

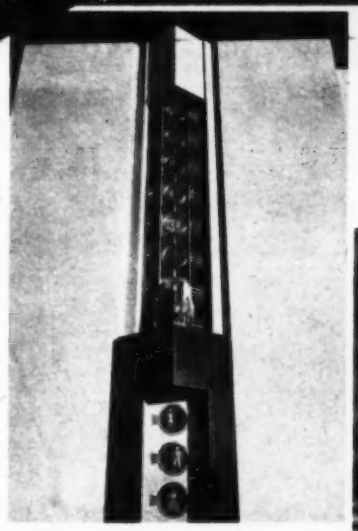
Once smooth, flawless concrete meant costly rubbing and finishing. Now . . . when perfect exposed surfaces are specified . . . all you have to do is use Plyform, the concrete form grade of Douglas Fir Plywood.

Plyform serves as sheathing and lining combined. It gives 100% coverage without waste, strips easily and gives numerous re-uses when handled with reasonable care. (When re-uses up to the physical limitations of the panels are desired, specify Concrete Form Exterior.)

Plyform is made from special veneers and special highly water-resistant glues. Every panel is sanded satin-smooth, oil-treated and edge-sealed at the mill. It is also stamped with the distinctive diamond-shaped "grade trade-mark" shown below and edge-sealed in silver-green to make identification and specification easy.

In most areas Plyform costs just over 1c a square foot more than SO2S Plypanel of the same size and thickness, but is worth more because it's engineered specifically for concrete form work. Learn now all that Plyform can do for you . . . how it can produce better work at lower cost.

**For technical assistance or for a free 12-page booklet giving more information about Plyform, form details, instructions on care and storage and other data, write Douglas Fir Plywood Ass'n, Tacoma Bldg., Tacoma, Wn.**

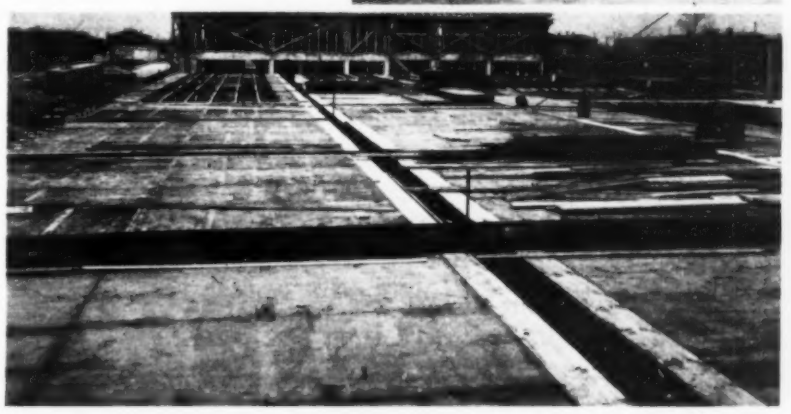


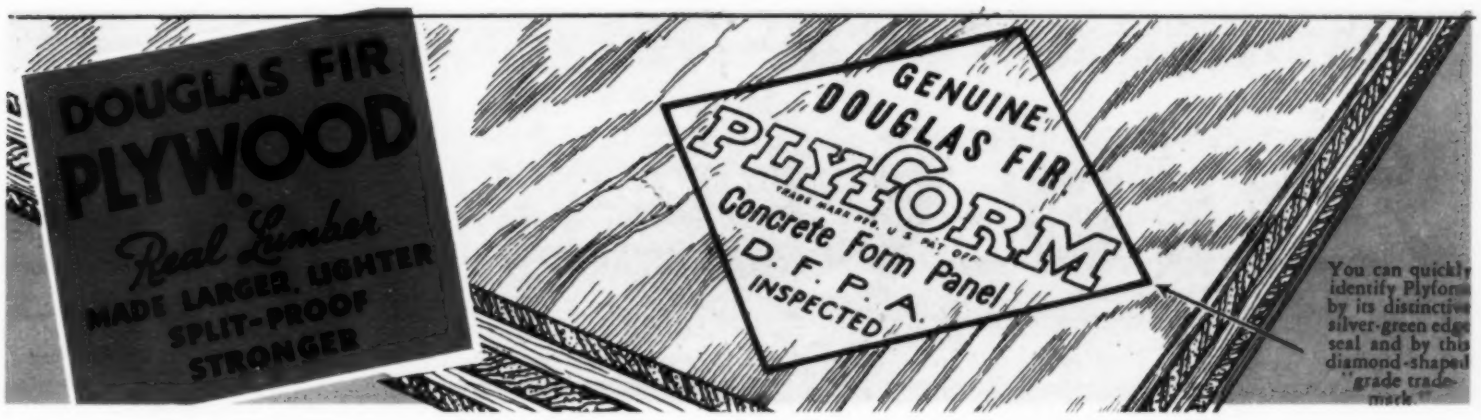
**IBERIA PARISH COURT HOUSE**

***(Above & left)*** **The smooth, gleaming surfaces of this striking court house in New Iberia, La., are another eloquent Plyform testimonial. A. Hays Town, architect; Thomas Lucy, engineer; Gravier & Harper, contractor.**

**FT. KNOX BARRACKS**

***(Right & below)*** **That every Plyform Panel gives real coverage is proved again in these photographs of Government Barracks constructed at Fort Knox, Ky. 3/4" was thickness used.**





Drill Jumbo and Cherry Picker, Shaft 13A

Head-frame, Shaft 6

Tunnel Heading, Shaft 16

Concreted Tunnel, Shaft 17 (uptake)

General View Tunnel, Shaft 11

# Over 50,000 Rounds to Hurry Water to New York!

Loading from Drill Jumbo at Shaft 2A

DRILL, shoot and load out over 50,000 rounds in tough, hard rock.

That's some order! To do it with safety, speed and efficiency requires the finest talent there is.

And that's the situation on the Delaware Aqueduct. Progress is ahead of schedule. Safety is much greater than seemed possible.

This world's longest tunnel is indeed an outstanding example of American engineering and contracting genius—a project on which Atlas is proud to have been a principal supplier of explosives and blasting supplies.

**ATLAS EXPLOSIVES**

*"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. · Offices in principal cities · Cable Address—Atpowco

# MECHANIZE

## *and* GET *the* JUMP ON THOSE VARIED AND SCATTERED JOBS

• Job costs will be up and time limits shorter in '41. And that's where Universal-Lorain mechanized shovels, cranes and draglines fit into the picture. You can move these units fast and frequently at small cost because they travel to and on the job on a special Crane Carrier equipped with 10 rubber-tired wheels. Their Balanced Center Drive turntable assures ample power, strength and capacities for handling a wide variety of work efficiently. All units are available with convertible shovel, crane, clamshell, dragline and backdigger boom equipment which increases their versatility and economy still more.

Mechanized Moto-Cranes*—Moto-Shovels—Moto-Drags—the newest things on wheels, yet a proven quantity both as to design and performance. If you want to service more jobs at a saving of time and money, write for new fully illustrated 24-page catalog describing these modern Universal-Lorain units.

**UNIVERSAL CRANE DIVISION**
**THE THEW SHOVEL COMPANY**
LORAIN, OHIO

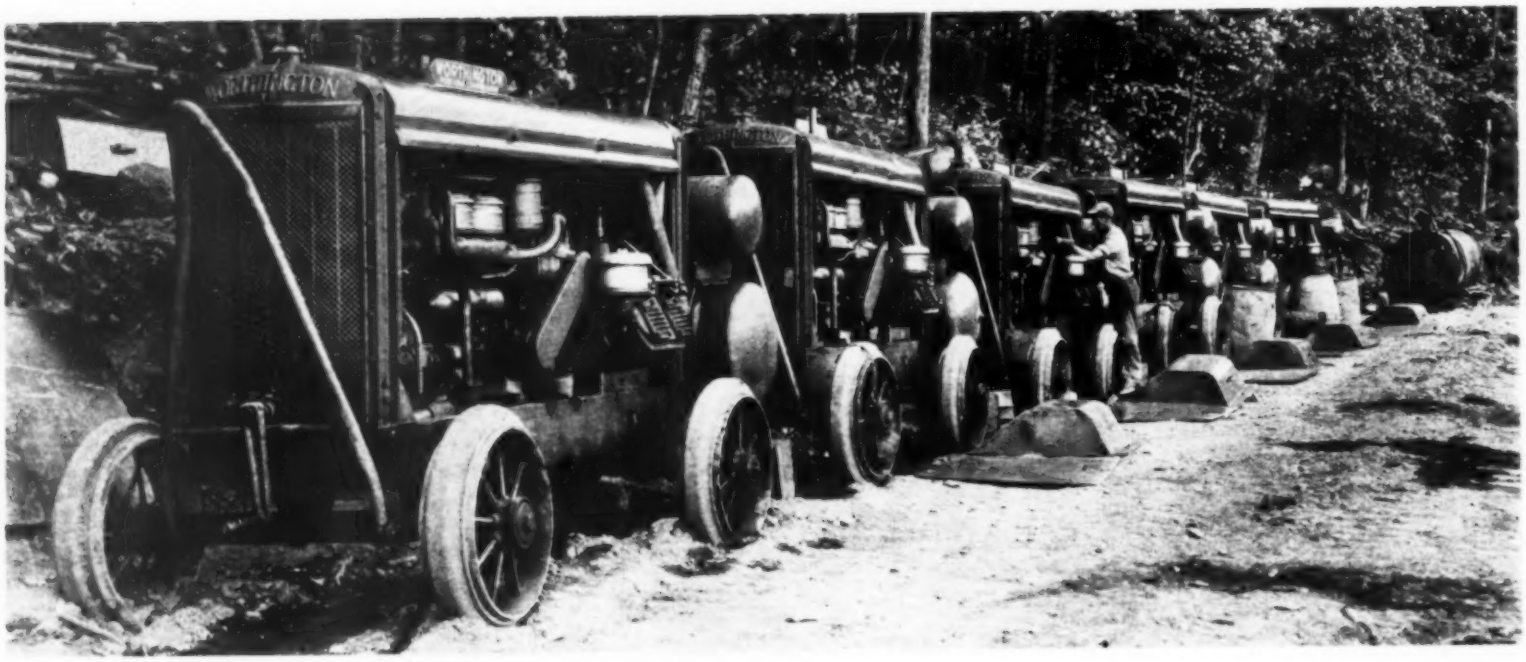
THEW CENTER DRIVE

*TRADE MARK

**UNIVERSAL LORAIN MOTO-CRANE***

NO JOB TOO SMALL OR SHORT—NO JOB TOO BIG OR TOUGH

# BIG Savings on



**Every contractor wants to keep his costs down. That's how he gets the job... and that's how he makes a profit on it. An ever-increasing number of contractors are saying "Give me MORE WORTHINGTON IN '41"... they know Worthington Equipment will keep their costs down.**

# a BIG JOB..!

**Sutton Company, of Radford, Virginia, now working on the famous Skyline Scenic Highway, makes the following statement:**

> **"... We are entirely pleased with the performance of each and every one of the eight 315 Worthington Diesel-driven Compressors we have been working this past year, and want to congratulate you on the valuable service your firm has rendered us."**

**Worthington Compressors and Air Tools have cut costs in a big way for Sutton Company on the Skyline Drive.**

**WORTHINGTON Portable Compressors, Rock Drills and Air Tools have established a new standard in "cost cutting" for the contractor. The famous "Feather Valve" in every Worthington Compressor guarantees the highest efficiency in air production; Worthington engineering skill has developed many outstanding features in Worthington Rock Drills and Air Tools, for greater efficiency and economy of operation. These exclusive features, plus the basic quality of all Worthington Construction Equipment, add up to lower costs for the user.**

*"More Worthington in '41 will give you More Profit in '41"*

***There is a Worthington Distributor or Branch Office in your area that will give you prompt local service.***

PC1-1

**WORTHINGTON**

**WORTHINGTON PUMP AND MACHINERY CORPORATION • HARRISON, NEW JERSEY**

**HOLYOKE COMPRESSOR AND AIR TOOL DEPARTMENT**

**Holyoke, Massachusetts**

# GMC POWER

# HAS NOT BEEN MATCHED

## *GMC SUPER-DUTY ENGINES ARE STILL THE STRONGEST PULLERS OF ALL*

*— SIZE FOR SIZE —*

General Motors Trucks give the driver the breaks in every way! Steering is as much as 57% easier, with GMC Ball-Bearing Steering. GMC Cradle-Coil Seats introduce real "passenger car riding ease." There's generous leg room for big drivers in GMC's all-steel Rider-Ease Cabs. For comfort and performance, there simply isn't anything like a GMC! See and drive one of these value-built trucks today.

**GMC TRUCKS**

GASOLINE • DIESEL

*The Truck of Value*

*Our own YMAC Time Payment Plan assures you of lowest available rates*

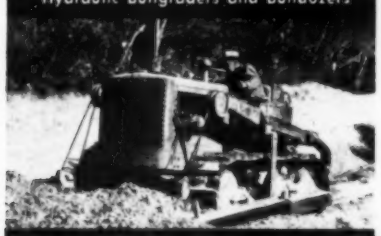
# 1941

## make it A BIG PROFIT YEAR with BUCYRUS ERIE TRACTOR EQUIPMENT

With the largest construction volume in eleven years indicated for 1941, you're going to need equipment that really produces and keeps going under pressure. With the defense program under full swing, the heat is on. There'll be plenty of work for you, but to make money on it, big money, you'll need equipment that can stand the gaff!

More than sixty years in the dirt-moving game have given Bucyrus-Erie the experience, knowledge, and skill to produce the best there is in materials, design, and workmanship. That's why, when you buy Bucyrus-Erie tractor equipment, you get the toughest, most productive units on the market. And those are the kind of units you're going to have to use to make 1941 the big-profit year it should be.

Hydraulic Bullgraders and Bulldozers



Cable Bullgraders and Bulldozers

Power Control Units

Rippers

Tamping Rollers

Back Dump Scrapers

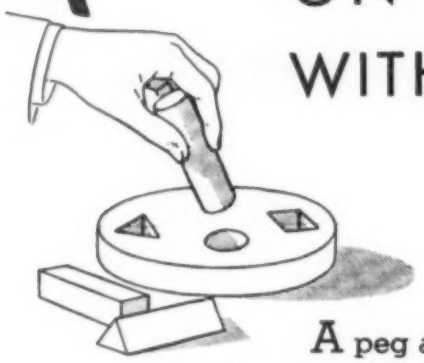
*See Your*

**INTERNATIONAL TracTracTor DISTRIBUTOR**

# Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN

# *Replace* WORN CABLE ON YOUR SCRAPER EQUIPMENT WITH "FLEX-SET" PREFORMED YELLOW STRAND



A peg and its hole, a scraper and its cable . . . for each there is *one best fit.* And because pay loads move faster, more smoothly and at lower cost with "Flex-Set" Preformed Yellow Strand on the job, it's the "must have" choice of contractors and operators in ever-growing numbers.

When you replace worn wire rope with a new reel of free-running Yellow Strand, you get the specific size, length and construction engineered for your machines. You get the correct field-tested safety factor: proper balance between line pull and rope strength, to forestall costly shut-downs for machine repairs. Preforming supplies the limberness that makes handling easy . . . curtails kinking . . . prolongs rope life mightily by resisting metal fatigue.

On cable controlled equipment the *cable* itself is no place to experiment. Protect your investment by making sure that the rope you install has a yellow strand. Broderick & Bascom build it for you, combining the quality of finest drawn-to-order steel wire with the performance that comes from 65 years of concentration on wire rope applications. Our distributor in your locality stocks and gives quick service on your special scraper cable. Start with Yellow Strand . . . *stay* with Yellow Strand . . . for savings you can see and measure.

## BRODERICK & BASCOM ROPE CO., ST. LOUIS

*Branches:* New York, Chicago, Houston, Portland, Seattle. *Factories:* St. Louis, Seattle, Peoria

*Distributors in All Industrial Centers*

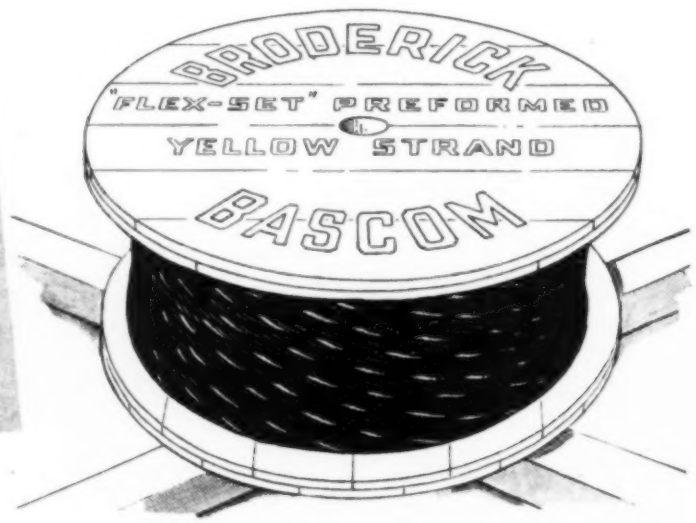
**"PAY DIRT"**

Yellow Strand helps keep pay yards and profits rolling: by requiring fewer cable changes . . . by taking the shocks that would otherwise damage vital parts and cause expensive delay. Accept no substitute for time-tried Yellow Strand "Flex-Set" Preformed Wire Rope on

ALL-PURPOSE SCRAPERS

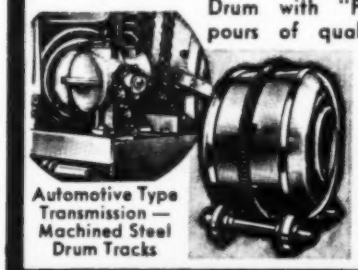
'DOZERS • • RIPPERS • • CRANES

And All Other Cable Controlled Equipment



## DEMAND These Features in Your Concrete Mixer

- AUTOMOTIVE-TYPE TRANSMISSION — fully enclosed, 30% to 40% more efficient, quieter, smoother, longer lived.
- MACHINED, HIGH CARBON STEEL DRUM TRACKS, on chilled, ground "carwheel" rollers, ball bearing shafts.
- Automatic Skip Shaker Loader, Criss-Cross Re-Mixing Drum with "Pressure" Discharge for faster pours of quality concrete — End discharge design, with Shock Absorbers, Timken Bearings, Pneumatic Tires and interchangeable 2 or 4-wheel mounting in sizes up to 14S — Heavy duty service with portability, easy handling.



Automotive Type Transmission — Machined Steel Drum Tracks

Get Catalog, Prices—3½S to 56S

**JAEGER MACHINE CO.**
800 Dublin Ave., Columbus, Ohio

**JAEGER SPEEDLINE**

## JAEGER, ALONE, Gives You All These Pumping Features

- JAEGER "PRIMING JET"—Up to 5 times faster priming and re-priming—often means difference between profit and loss on job. No adjustments—no need to "gun" engine.
- POSITIVE RECIRCULATION CUT-OFF — It's controlled by flow, not pressure.
- "FULL-RANGE" IMPELLER gives high efficiency under all conditions (built of steel in 4" to 8" sizes).
- ACCESSIBLE SEAL — always outlasts the impeller.
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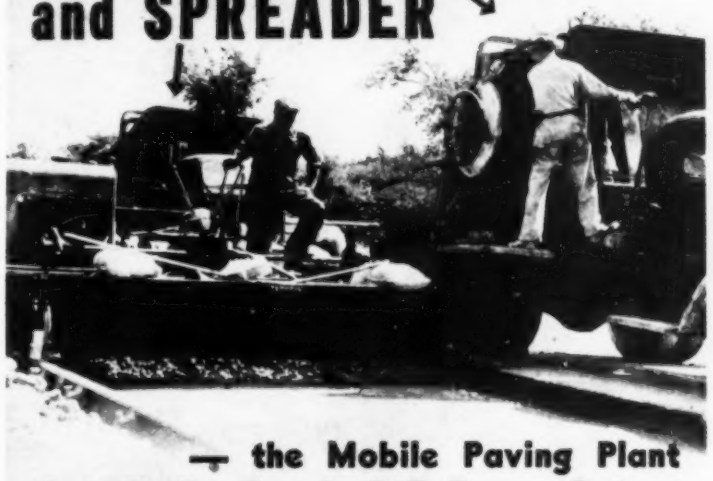
**JAEGER "Sure Prime" PUMPS**

# JAEGER "AUTO-PAVER" and SPREADER



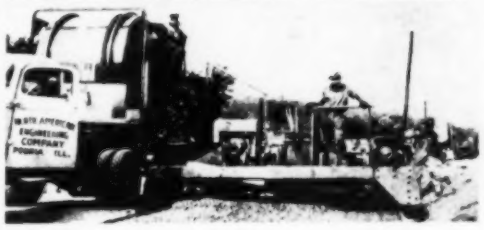
## — the Mobile Paving Plant that Easily Equals 34E Paver Output

### *Contractors Everywhere are Waking Up to the Advantages of This Low Cost Method, Used in Many States!*

**Jaeger Auto-Pavers mix in transit while they roll on trucks from batcher or transfer plant to job. The Jaeger Screw Spreader takes the concrete as fast as the Auto-Pavers can deliver it, remixes, spreads and strikes it off ready for steel mesh or final finishing. This is the modern mechanized paving method that progressive contractors are rapidly adopting.**

**It is mobile and flexible, maintains steady production, can easily equal 34E paver output, permits Pavers to operate on subgrade or slab, is ideally adapted to vibratory mixes and reduces job costs. Screw Spreader improves slab texture, saves men in pit and speeds finishing (25 used on Pennsylvania Turnpike alone).**

**New Catalog TMP-41 gives full details. Write for copy.**



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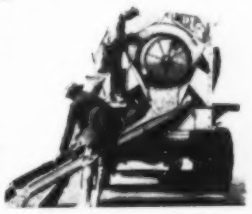

### Jaeger "HIGH DUMP" Truck Mixers Solve Placing Problems on Many Jobs—Produce Higher Strength, Workable Concrete

**Fastest to load, mix and discharge of any units of their type — high discharge point permits dumping into big hoppers, buckets, over dirt piles or wide radius spouting. Load top or end, as desired. Get Catalog TMH-41.**

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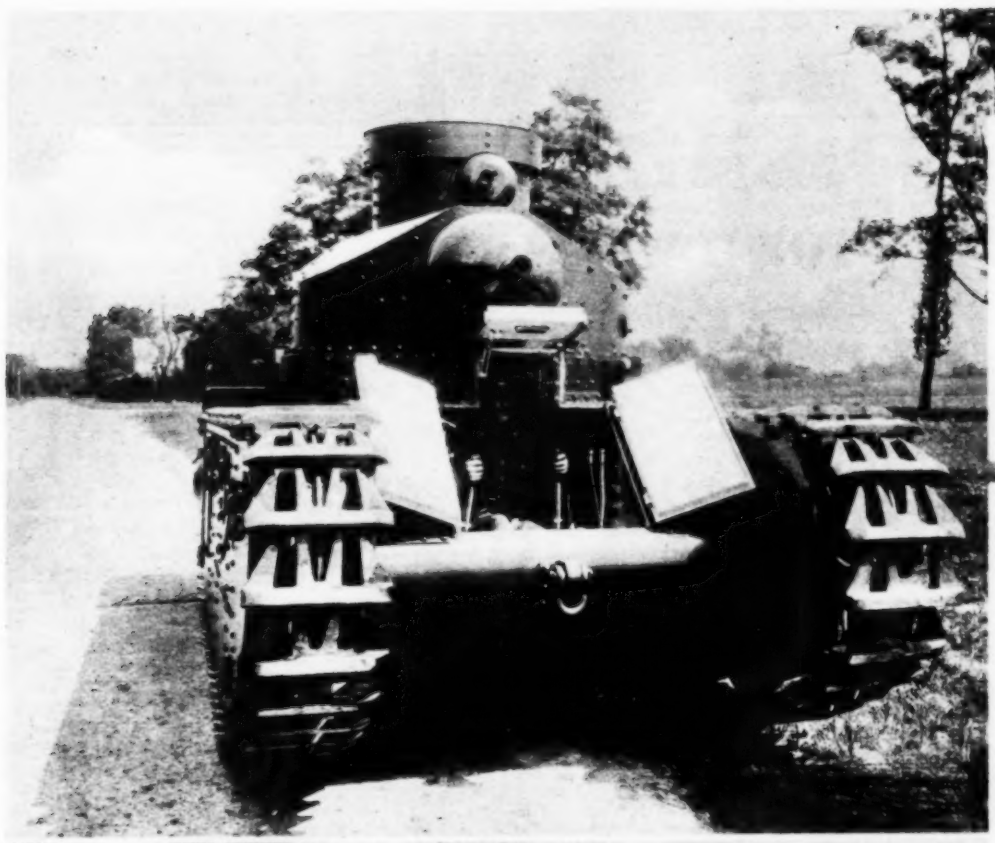

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(*Left*) **EQUIPMENT OF SAMUEL R. ROSOFF, LTD.** *operating on portion of Delaware Aqueduct under N. Y. Board of Water Supply's contract No. 313. Sinclair Opaline Motor Oil used in all trucks, cranes and shovels.*

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YOU can see for yourself why it pays to use whichever of these three great Goodyear off the-road tires best fits the job you're doing—why the *right* tread gives you better traction and pull. Equally important, in all such work you need bigger, wider tires than in regular highway service handling similar loads.

Because bigger tires provide greater air cushion, they "float" loads over soft ground without bogging down—"flow" over rocks and road irregularities without snagging or rupturing the carcass—roll more freely without bead strain or rim-cutting.

That is why Goodyear builds these tires in sizes up to 16.00, 18.00 and even 24.00 inches cross section in some types—to insure more efficient operation, longer life, eliminate trouble and lower annual tire costs. Goodyear dealers will be glad to recommend proper sizes for your operation and equipment.

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# Construction Methods

ROBERT K. TOMLIN, Editor

Volume 23 | FEBRUARY, 1941 | Number 2

## Pay Off

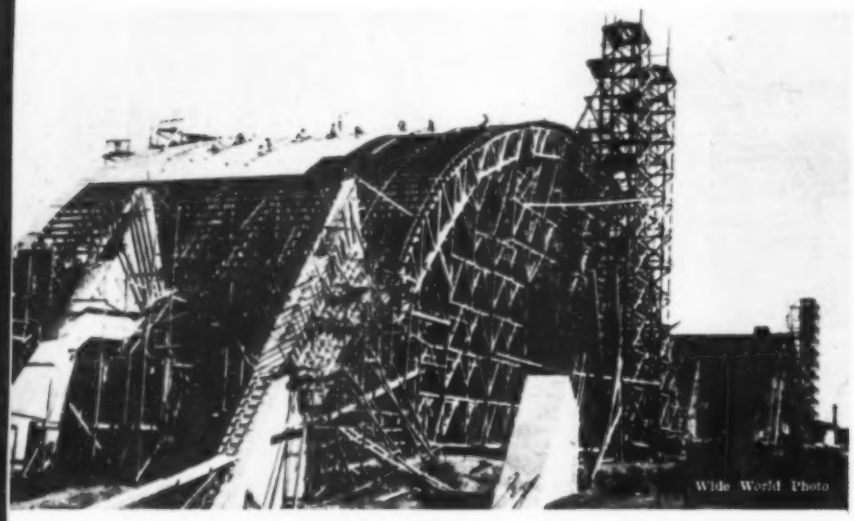
### For 18,000 Defense Workers on $75,000,000 Powder Plant Done From Wagons Moving About Job

**EXPANDED FROM AN INITIAL $25,000,000** project to one that, at this writing, will involve expenditures of approximately $75,000,000, the huge plant for the manufacture of smokeless powder at Charlestown, Ind. is the scene of large-scale construction operations by forces of E. I. du Pont de Nemours & Co., Inc. With a payroll of 18,000 employees engaged in building the plant, the job calls for special measures of handling personnel and transporting them to and from the points at which they are assigned to work.

The accompanying illustrations indicate the size of the veritable army of construction workers that

*(Continued on page 82)*

**NEW BRIDGE 2 MI. LONG** crosses Potomac River to link Ludlow Ferry, Md., with Virginia Shore. Wichert girders and trusses in addition to 800-ft. cantilever span are features of 10,050-ft. structure designed by J. E. Greiner Co., of Baltimore, and erected by Harris Structural Steel Co. on steel-pile-supported concrete-filled caisson foundations and steel-pile bents built by Merritt-Chapman & Scott Corp. Substructure required 37½ mi. of steel H-piles, weighing 7,750 tons, in lengths up to 194 ft. Maryland State Roads Commission will operate structure as toll bridge.

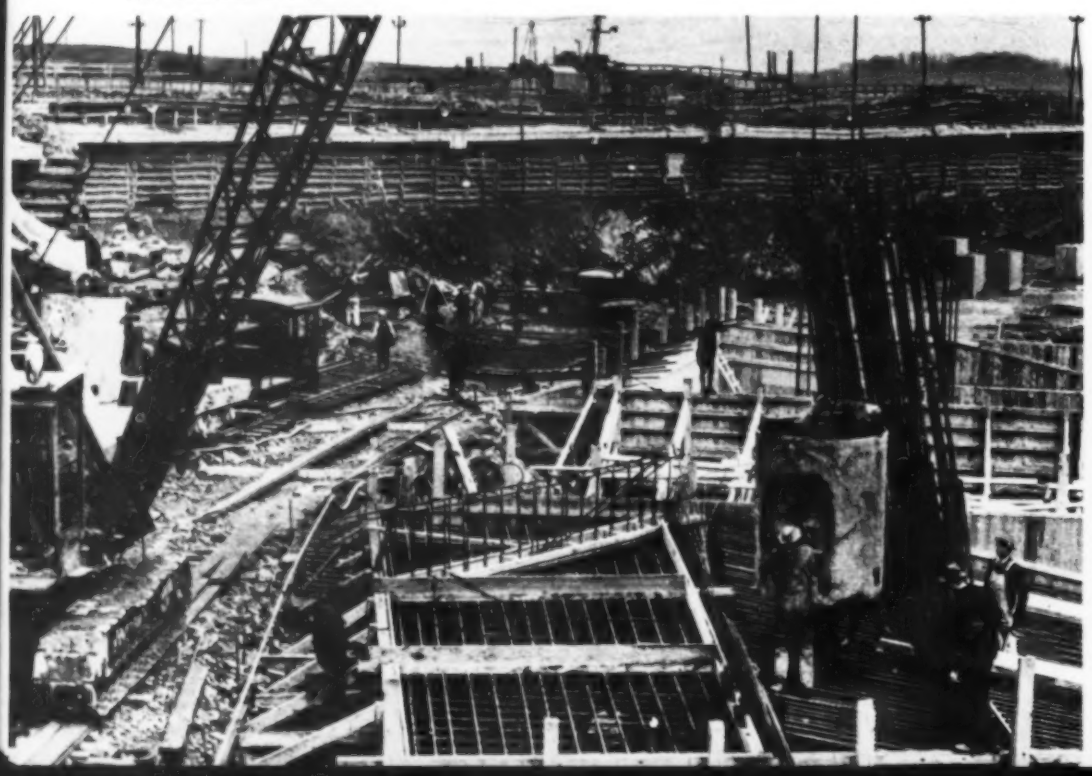


Wide World Photo

**CONCRETE HANGARS,** instead of more widely used steel frame construction, are being built at U. S. Army's new air base at Punta Borinquen, Porto Rico. Structures of thin shell design with supporting arch ribs are large enough to accommodate biggest bombing planes.

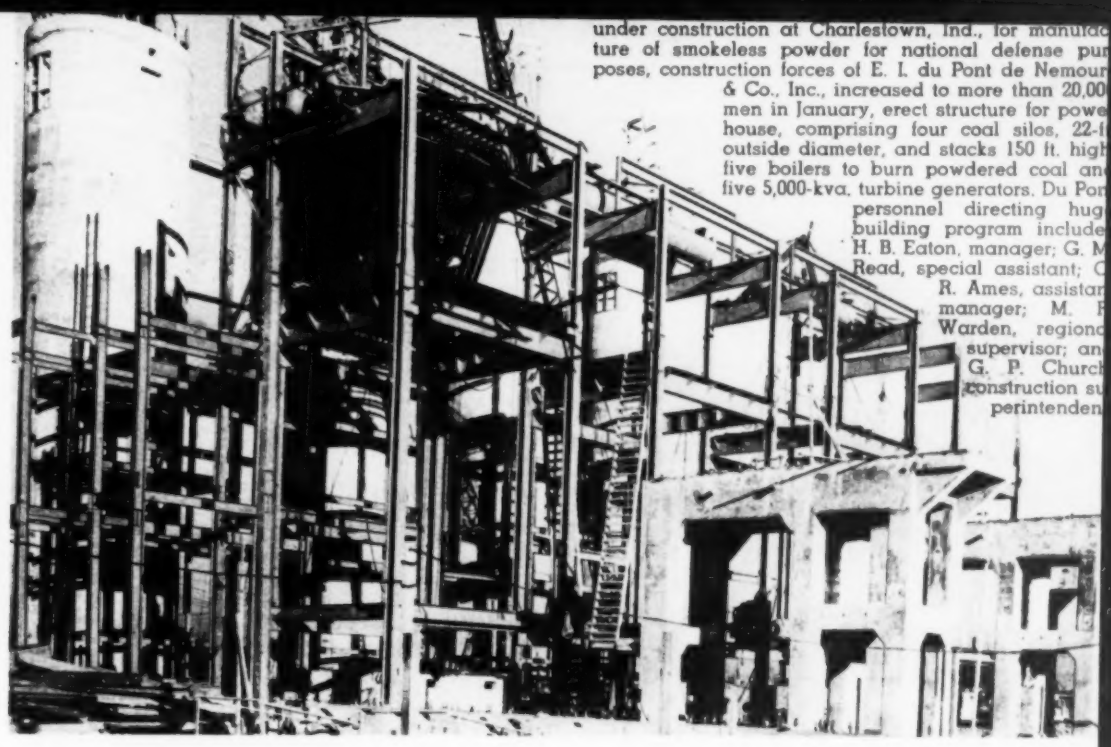
# THIS MONTH'S NEWS REEL

**DEFENSE DAM AHEAD OF SCHEDULE**—Five months after Cherokee dam on Holston River, Tenn., was authorized, first bucket of concrete was placed Dec. 30, 1940 by construction crew of Tennessee Valley Authority. Work is approximately one month ahead of even short schedule of 20 months set when National Defense Advisory Commission recommended construction of dam to Congress so that more power would be developed for making of aluminum for airplanes. Normally about eight or nine months elapse between time work is started on dam and concrete is placed. Photo shows first bucket being poured in downstream block of retaining wall adjacent to spillway section, on south side of river.



**VLADECK HOUSES (below)** is newly completed slum elimination project of New York City Housing Authority on Lower East Side of Manhattan. Group of 24 modern fireproof 6-story buildings on 18-acre tract provides homes of from 2½ to 5½ rooms for 1,771 families in low income group. Total cost was $9,541,000 or about $5,387 per dwelling unit. Contractors for project were Cor-

A. Aubrey Bodine Photo



under construction at Charlestown, Ind., for manufac ture of smokeless powder for national defense pur poses, construction forces of E. I. du Pont de Nemour & Co., Inc., increased to more than 20,00 men in January, erect structure for powe house, comprising four coal silos, 22-f outside diameter, and stacks 150 ft. high five boilers to burn powdered coal an five 5,000-kva. turbine generators. Du Pon personnel directing hug building program include H. B. Eaton, manager; G. M Read, special assistant; C R. Ames, assistan manager; M. F Warden, regiona supervisor; an G. P. Church construction su perintenden

**BOMB-PROOF SHELTERS** of concrete construction for civilian protection during air raids, built by Vacuum Concrete Inc., in less than 5 hr., are subject of experiment and test by officials of U. S. Housing Authority. Technical Director A. C. Shire of USHA inspects newly completed unit.

Wide World Photo

U. S. Navy Photo

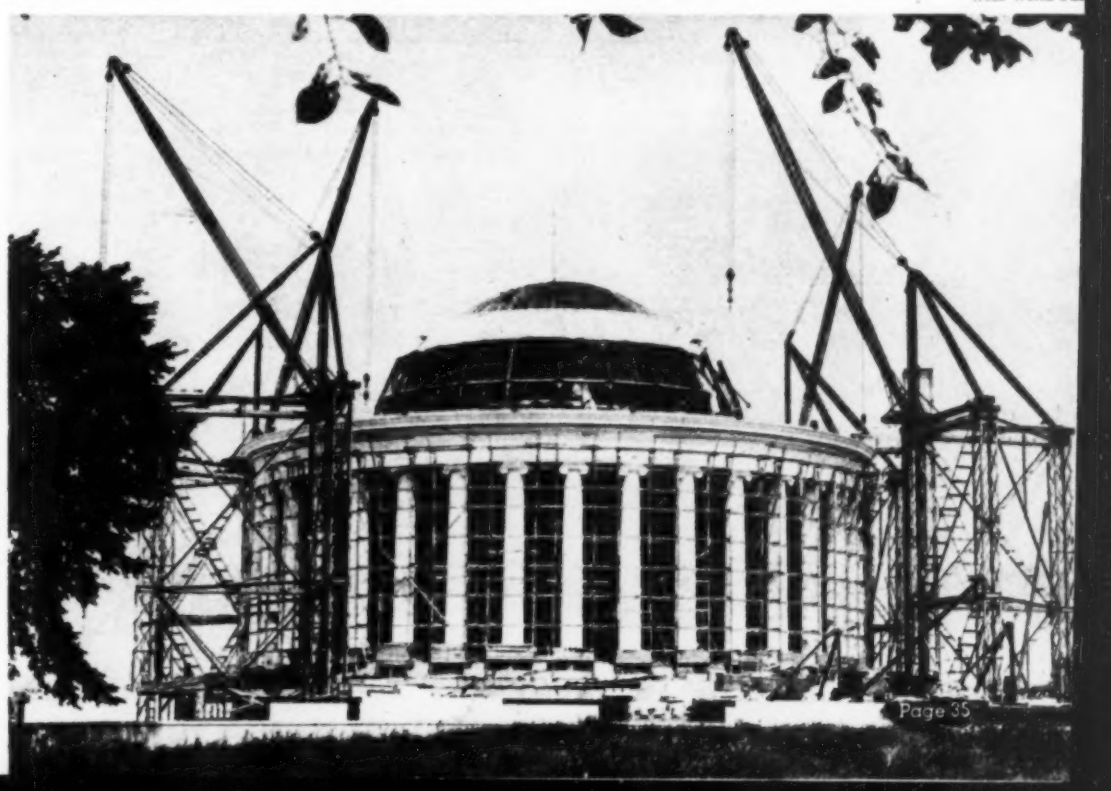
**DRY DOCK EXCAVATION** at Navy Yard is handled by Dry Dock Associates, contracting firm made up of Spencer, White & Prentis, Inc., Foley Bros. and Merritt-Chapman & Scott Corp., with dipper dredge, Crest, of Great Lakes Dredge & Dock Co. Normally using 16-yd. dipper for depths to 52 ft., dredge readily changes to longer spuds and dipper stick, with smaller bucket, for deeper dredging. Material is loaded into barges at rate of 10,000 to 12,000 yd. per day as first step in construction of dry dock.

betta Construction Co., on substructure, and George A. Fuller Co., on superstructure. Chief architect was R. F. Shreve. For New York City Housing Authority, Gerard Swope is chairman, Allan S. Harrison is director of public housing and John P. Riley is acting construction deputy.

Arnold & Kellogg Photo

**THOMAS JEFFERSON MEMORIAL (below)** in Washington, D. C., $3,000,000 domed structure on which work was started in December, 1938 nears completion as forces of John McShain, Philadelphia, use stiff-leg derricks, mounted on steel towers with latticed columns, to place material.

Wide World Pho



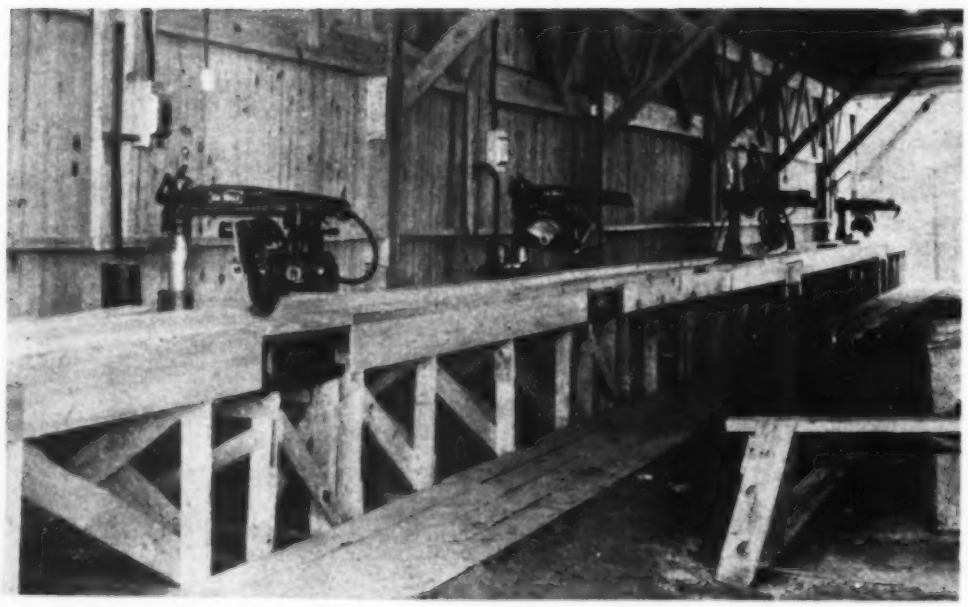
**WOOD MILL** equipped with eleven electric-motor-driven variable-adjustment saws is laid out in four production lines to take lumber brought in from railroad cars at near end and deliver finished pieces ready for erection to waiting trucks at far end.

**LAID OUT LIKE A FACTORY** to operate on a straight production line basis, a central wood mill precuts all framing lumber for 1,125 buildings being erected by the Consolidated Engineering Co., Baltimore, in a new army training camp at Fort George G. Meade, Md. Eleven completely adjustable electric power saws, set up over continuous benches in four production lines, turn out 40,000 dimensioned framing pieces in an 8-hr. shift. Supplementing this central factory for production of framing pieces, 24 portable table saws are distributed about the job for power cutting of other lumber, leaving a minimum of hand sawing to be done on the 40,000,000 b. ft. involved in the entire project. Carpenter labor is thus conserved to speed completion of the $14,000,000 cost-plus-a-fixed-fee contract in the 3½ months allotted for the work by the Quartermaster General, U. S. Army.

# *Central Wood Mill*

## Precuts All Framing Lumber for $14,000,000 Army Camp

**HEAVY-DUTY SAW** driven by 5-hp. motor daps heel notches in 2-in. rafters, as demonstrated by Walter Mason, saw-yard superintendent, turning crank handle of chain feed which assists steady operation of large saw units.



**FOUR POWER SAWS** set up in continuous production line precut roof rafters and stair carriages to exact dimensions for erection in camp buildings.

*Job Organization*—To simplify overall supervision and definitely allocate responsibility for construction progress the contractor subdivided the project into seven independent sections, each of which functions as a separate construction job under the direction of a superintendent. The section is further subdivided into four distinct construction units, each supervised by an assistant superintendent responsible to the superintendent of the section. These men are assisted by a complete staff of timekeepers, tool checkers, material checkers, carpenter foremen and labor foremen.

Operating on a two-shift schedule, 5 days a week, each section employs about 1,200 men on the first shift and

**TERMITE SHIELDS** of galvanized sheet metal are placed on top of concrete posts. Anchor straps protruding through termite shields will secure wood sills in position. In background, carpenters are erecting forms for concrete foundation walls of heater room in another barracks building.

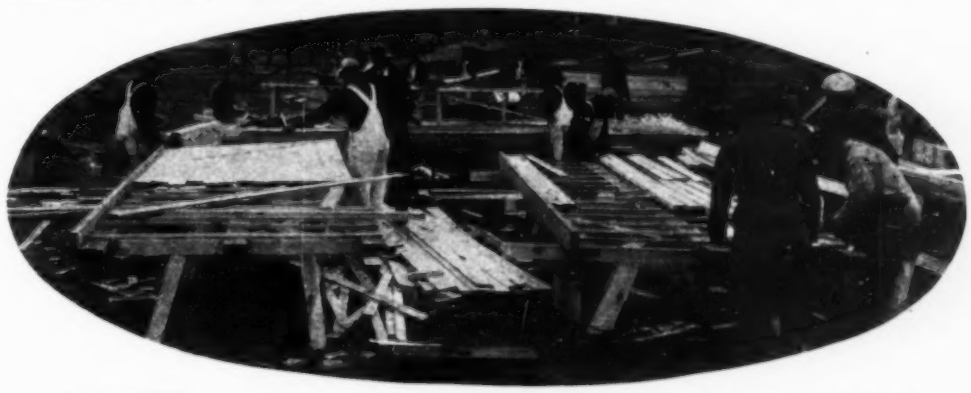
**24 PORTABLE SAW TABLES** powered by air-cooled gasoline engines facilitate field cutting of miscellaneous lumber on seven construction sections of large camp project.

about 800 on the second shift. Superintendents of the seven sections report to a general superintendent who acts under the immediate direction of the project manager, the top executive in charge of both the field construction organization and the central project office. This office is set up to act as a self-sufficient executive unit, with full management and purchasing powers independent of the company's Baltimore headquarters, and is departmentalized to take care of employment, materials, equipment, engineering, and accounts and records. The contractor's entire organization was designed to achieve the primary objective of working up to maximum construction speed in the shortest possible time; rapid acceleration was necessary to assure completion of all essential facilities for 18,000 men prior to the scheduled arrival of the 29th National Guard Division early in 1941.

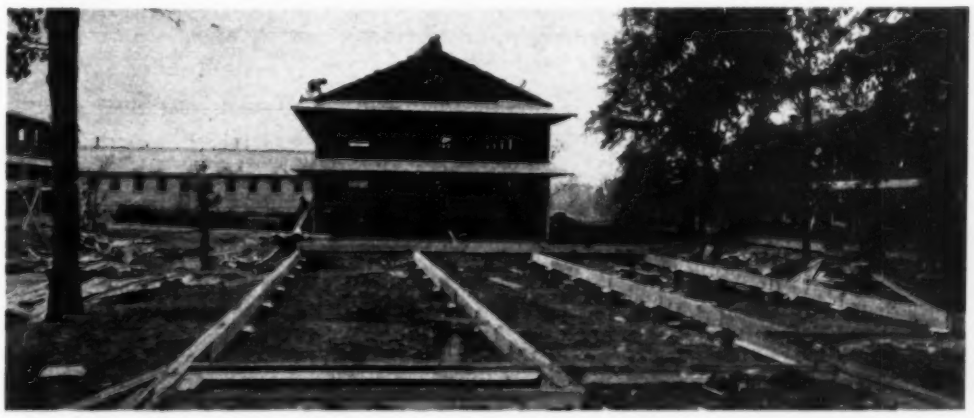
In the central project office building, erected by the general contractor, are the offices of the J. E. Greiner Co., Baltimore, engineers and architects for the camp, and of the constructing quartermaster, officer in charge of all operations at the site for the Quartermaster Corps. Close collaboration among the constructing quartermaster, the engineers and the contractor makes it possible to reach prompt decisions on frequent problems arising during rapid-fire construction of the camp.

*Number of Buildings*—Starting at the end of September with an original $11,500,000 contract stipulating completion by January 11, the project later was enlarged by about $2,500,000 worth of additional work, and a time extension was granted for completion of the additional construction. The original contract called for 908 buildings (listed in an accompanying table), 16 mi. of

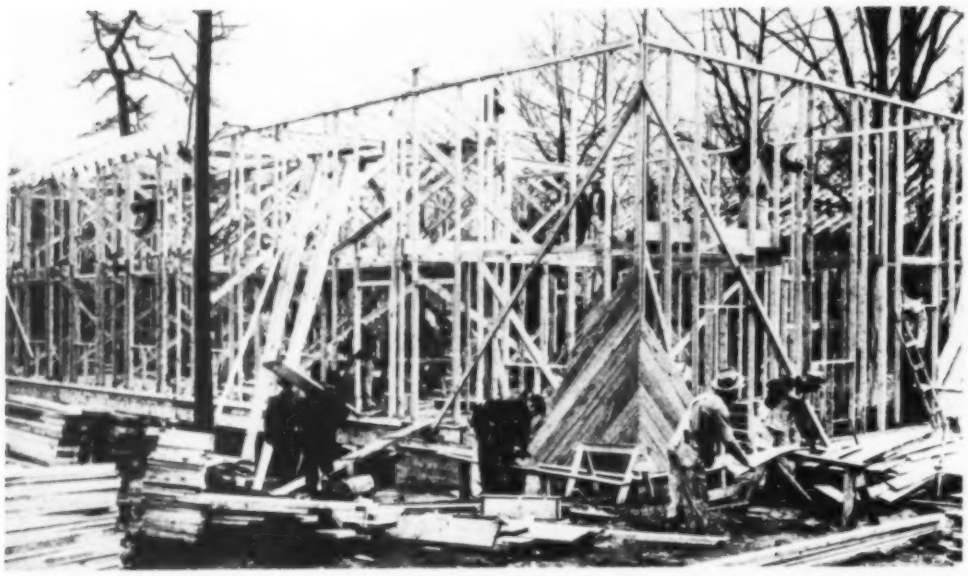
**TRUCK-MIXED CONCRETE** for foundations and slabs is delivered to column and wall footings by wheelbarrows moving over plank runways from Smith mixer on truck.



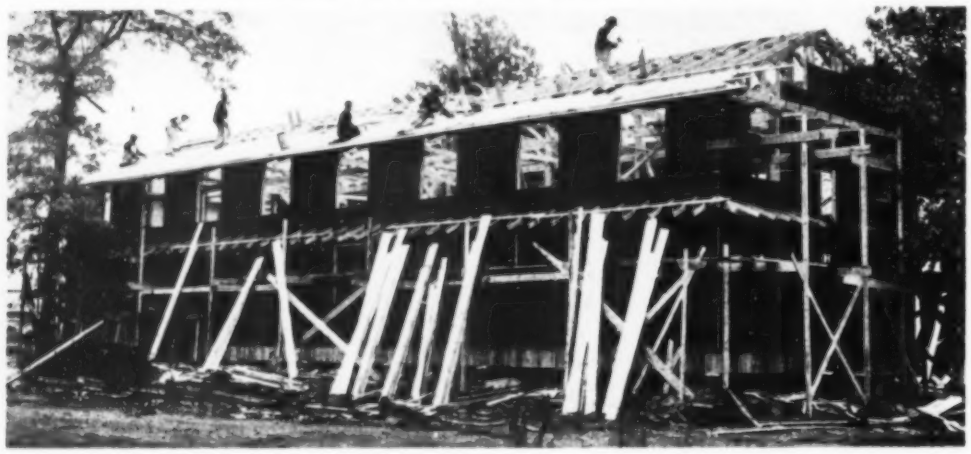
**PANEL FORMS** for foundation walls and columns are prefabricated by carpenters in field.



**TIMBER SILLS** consisting of three 2x8's spiked together rest on concrete posts covered by termite shields. On barracks buildings, under construction, building paper has been applied over gypsum board sheathing of exterior walls.

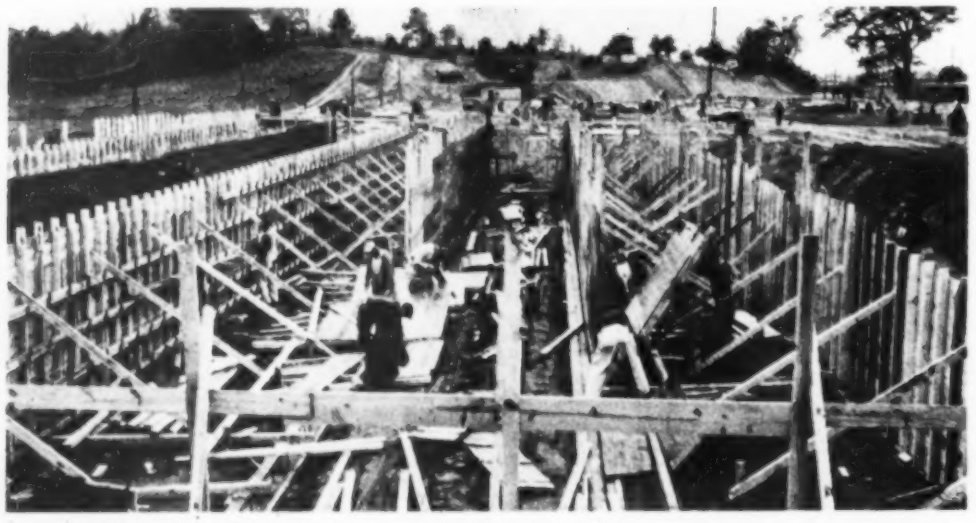


**DIAGONAL WOOD SHEATHING** is applied to wall framing of two-story barracks building.



**CARPENTER CREW** lays 1-in. roof sheathing on rafters of two-story barracks. Note overhanging eaves of roof and projecting wall brackets for construction of rain hoods above windows.

**ARRANGEMENT OF BARRACKS BUILDINGS** along camp streets conforms to standard rectangular plan adopted by War Department.

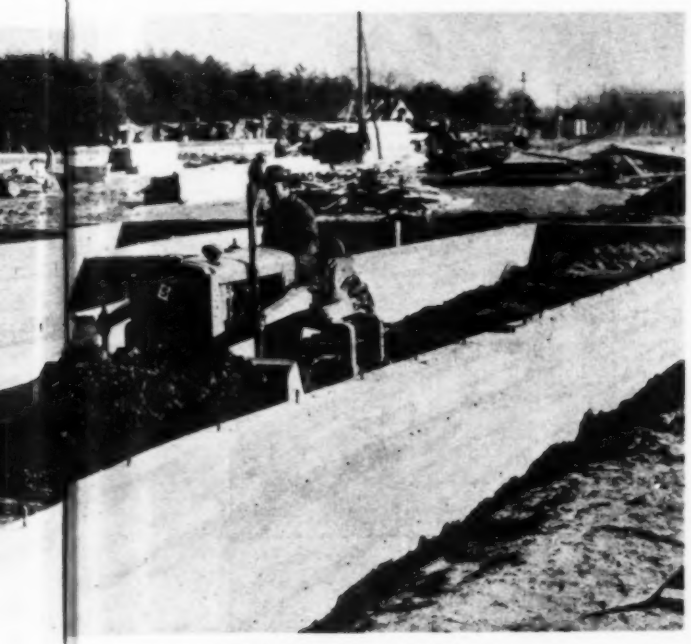


**PREFABRICATED PANEL FORMS** for warehouse foundation walls are erected and braced by carpenter crews.

streets and roads, a street lighting system, and sewerage and water systems. Later orders added 232 buildings, of which 70 are in a hospital group, and provided all the necessary facilities and utilities for the additional units. The expanded project will furnish accommodations for about 25,600 men.

*Labor Schedule*—During the first four weeks on the job, while operations were directed toward the erection of temporary construction facilities and the building of concrete foundations, the contractor employed two 8-hr. shifts, 7 days a week. Toward the end of this initial period demands by trade unions that their members receive double time for Saturday and Sunday work raised a problem for the management, as the funds allocated to the project by the

**PORTABLE PAINT SPRAY OUTFIT** outside barracks building supplies pressure stream through hose to painter spraying walls and ceiling in dormitory on first floor.



**THIN CONCRETE WALLS** of warehouse foundation must be supported by earth backfill between walls. Allis-Chalmers gasoline tractor equipped with Gar Wood bulldozer places backfill.

War Department were not adequate to cover the double charge for week-end labor. Beginning with the week of October 28, the working schedule was revised to a basis of two shifts, 5 days a week, with Saturday and Sunday labor being employed only in emergency or in the operations of a few trades which permitted week-end work at less than the double wage scale.

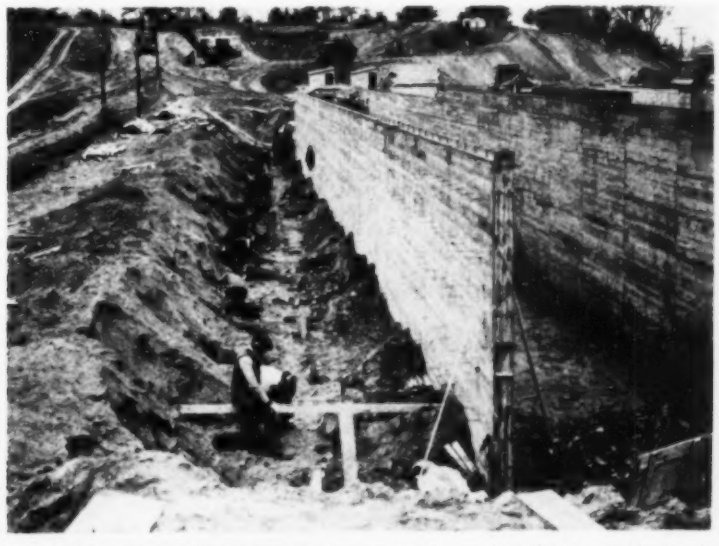
As already noted, each section employs a total of about 2,000 men on the two shifts, making a grand total for the project of about 14,000 workmen. Because of the brief time allotted for the job, any advantages to be gained through selection and training of specialist gangs from this labor army appeared too illusory to warrant a change from common job practice, and the contractor relied on the ordinary proce-

*(Continued on page 86)*

**ONE-STORY BUILDINGS (above and below)** 37 ft. or more wide have roof framing of timber trusses carrying purlins for support of roof.

**GRADING OUTFIT** consisting of two Caterpillar 96-hp. diesel tractors drawing LaPlant-Choate 17-yd. and LeTourneau 12-yd. scrapers prepares grade on one section of inter-regimental road, involving 4 mi. in all, which will be stabilized with hauled-in gravel and paved with 4 in. of hot-laid bituminous base and 2 in. of sand-asphalt top, followed by seal coat consisting of about ¼ gal. of RC-1 cutback asphalt and about 25 lb. of pea gravel.

**FIRST-STORY DORMITORY** of typical barracks building has interior posts on 10-ft. centers and heating ducts suspended from second-floor joists. Partitioned rooms for non-commissioned officers are at far end.



**WITH PANEL FORMS STRIPPED** from warehouse foundation walls, workmen dig pits for concrete column footings to support loading platform. In background, two power shovels load borrow material out of hillside cut to build fill in warehouse area.

**TWO HEAVY WRECKING CRANES** of 35-40-ton capacity, equipped with 80-ft. booms, strip and demolish 14th St. express station, of "hump" type, with center express track elevated to upper station level above local tracks. Buses and other vehicles continue to operate on Ninth Ave. and on intersecting streets within close range of wrecking operations.

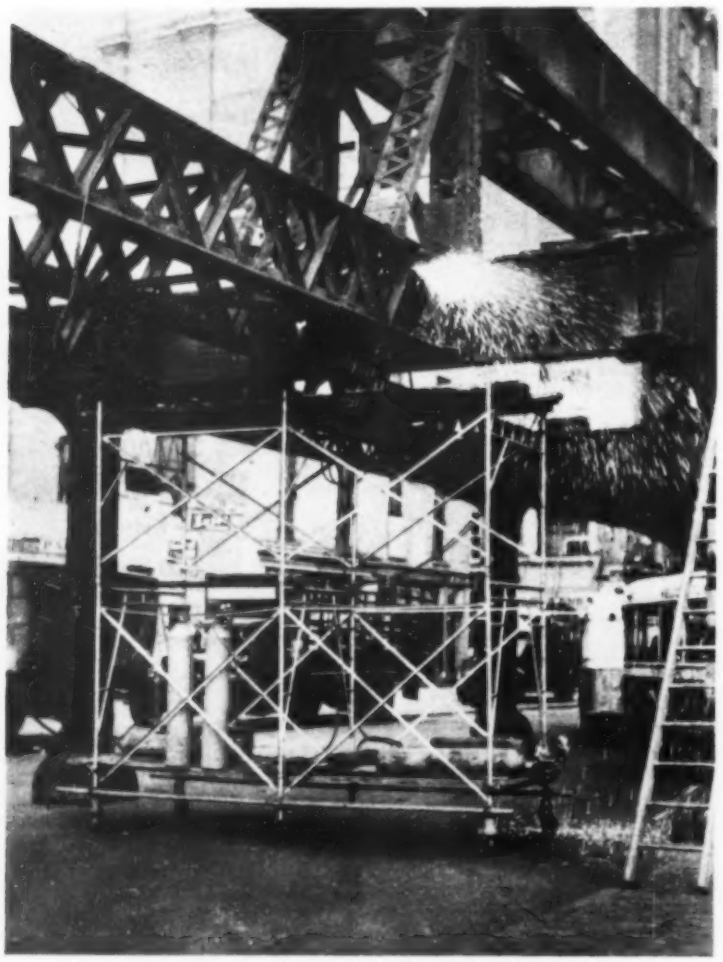
# *Speed With Safety*
# MARKS "EL" RAZING

**SAFETY TOOK EQUAL RANK WITH SPEED** in the planning of the Albert A. Volk Co., New York, for wrecking the Ninth Ave. elevated railway line, 10 mi. in length, under the direction of the city's Board of Transportation. Running from South Ferry (at the Battery) to 155th St., Manhattan, the elevated structure overshadowed miles of bus routes which maintained continuous service during the razing operation. At all points throughout the length of the line, normal vehicular and pedestrian traffic continued to use the streets and sidewalks under the El with a minimum of interruption and inconvenience. A force of 50 to 60 flagmen guided traffic past the points where wrecking was in progress.

Great care was necessary in dismantling and handling 55,000 tons of steel frame in units weighing up to 25 tons each without damage to property or to the public. As for the workmen themselves, their own skill and the vigilance of the foremen and pushers proved effective safeguards against the hazards of stripping, wrecking and loading track and structural units. Special pre-

*(Continued on page 42)*

**GENERAL SURVEILLANCE** over demolition tactics and progress receives constant attention of MICHAEL SHERIFF treasurer, Albert A. Volk Co., contractor.



**BURNERS WORKING ON ROLLING SECTIONAL STEEL SCAFFOLD** or on frame of elevated railway structure cut latticed double girders with gas torches served from oxygen and acetylene tanks on lower platform of scaffold. Note buses passing under El in right background.

**AFTER FLAME-CUTTING OF COLUMNS,** cap beam of El bent is placed by crane on top of double latticed girder previously loaded on truck-trailer combination.

**DOUBLE PLATE GIRDER** is burned free from tall bents and is lowered to truck-trailer by 37 ton-capacity crane from structure more than 50 ft. high in 8th Ave. just north of 110th St.

**KING POST TRUSS** weighing about 20 tons is handled on 80-ft. boom of 37-ton crane in Eighth Ave. at 111th St.

**WEIGHING AS MUCH AS LOADED EL CAR,** heavy crawler crane travels on timber pontoons which spread load on deck framing 56 ft. above pavement in 110th St.

**TYPICAL OF STRIPPING OPERATIONS** in narrow streets where El columns are set inside curb lines, truck crane working on timber pontoons on deck lowers scrap material to truck in Eighth Ave., 50 ft. below.

**TO WRECK STRUCTURE** 56 to 60 ft. high at 110th St., where El curves to right over store buildings into Eighth Ave., crawler crane weighing 35 tons and carrying 70-ft. boom operates on deck.

**FIELD OPERATIONS** connected with demolition of Ninth Ave. El are direct responsibility of JOHN A. RUTAN, (right), engineer, Albert A. Volk Co., ably supported by JOHN J. RYAN, iron foreman.

**TO WORK ON DECK** in stripping elevated railway structure north from Battery Place, heavy crawler crane lifts new truck crane (intact except for boom) from street to timber pontoons. Load is about 26 tons. Note how station has been stripped by advance gang preparatory to wrecking.

**55-FT. BOOM OF TRUCK CRANE** is raised by 82½-ft. boom of crawler crane to complete truck crane assembly. Truck crane has working capacity of 9½ tons.

cautions were enforced to protect burners cutting painted steel with oxyacetylene torches. At the time of employment, burners were given blood tests and urinalyses to determine their fitness for the work, and respirators of three types were provided to protect the workers against lead fumes when they were burning painted steel.

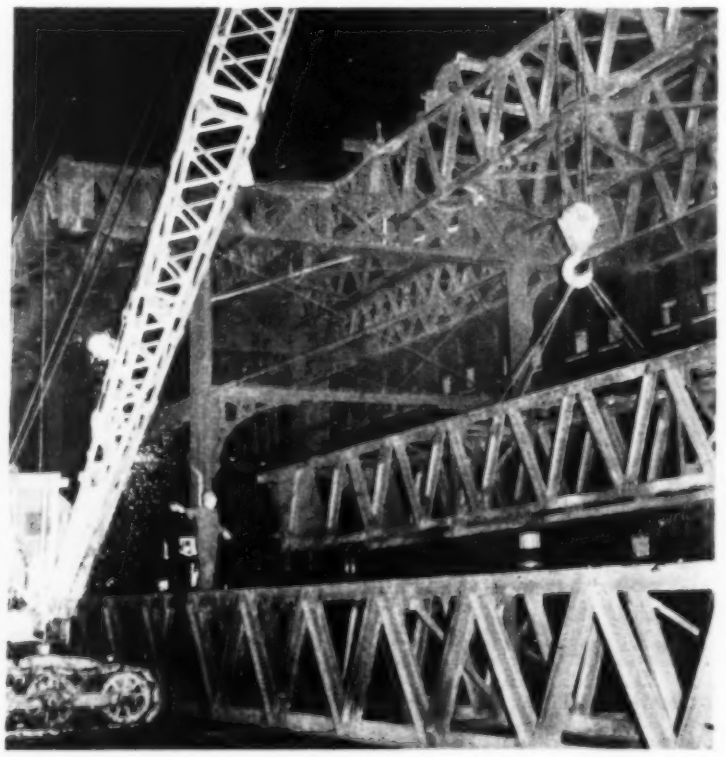
Speed requirements were met by employing a total of thirteen crawler and truck cranes (capacities of 37 to 9½ tons) and a maximum payroll of 600 men working 8 hr. a day 5 days a week. The cranes were distributed among seven working units, six equipped with two cranes each to do stripping and wrecking of superstructure, and the seventh equipped with one crane to remove columns.

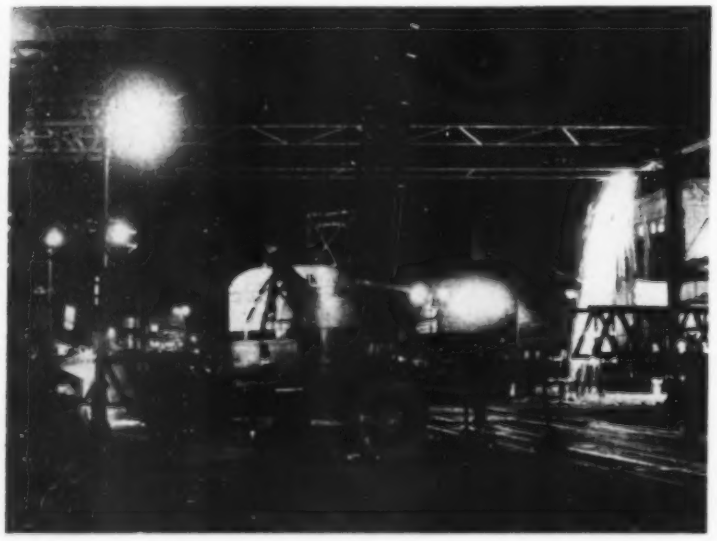
In September a low bid of $74,433 (plus salvage) won the contract award for the Volk firm. Although field operations did not begin until Oct. 7, the official starting date for the work was Oct. 2, and the contract stipulated completion in 5 months (by March 2), with a special provision that a 3½-mi. midtown section be removed and the pavement over column footings replaced in 3 months (by Jan. 2). The special requirement for the midtown section was fulfilled on schedule, and total demolition will be effected prior to the specified completion date. Stripping of rails, ties and deck structure was 100 per cent complete at the first of the year, and steel removal was 75 per cent complete.

*Wrecking Program*—In round numbers, the 10-mi. length of the line included 200 blocks, most of them of the city's standard 260-ft. length (twenty blocks to the mile). On the basis of a 5-day work week, the 5-month schedule provided 100 possible working days. With a 20 per cent deduction for bad weather, the available time in prospect

*(Continued on page 97)*

**WORKING BY LIGHT** of gas torches **(right)** and street lamps, ironworkers burn and lower 18-ton double track girders at 125th St.



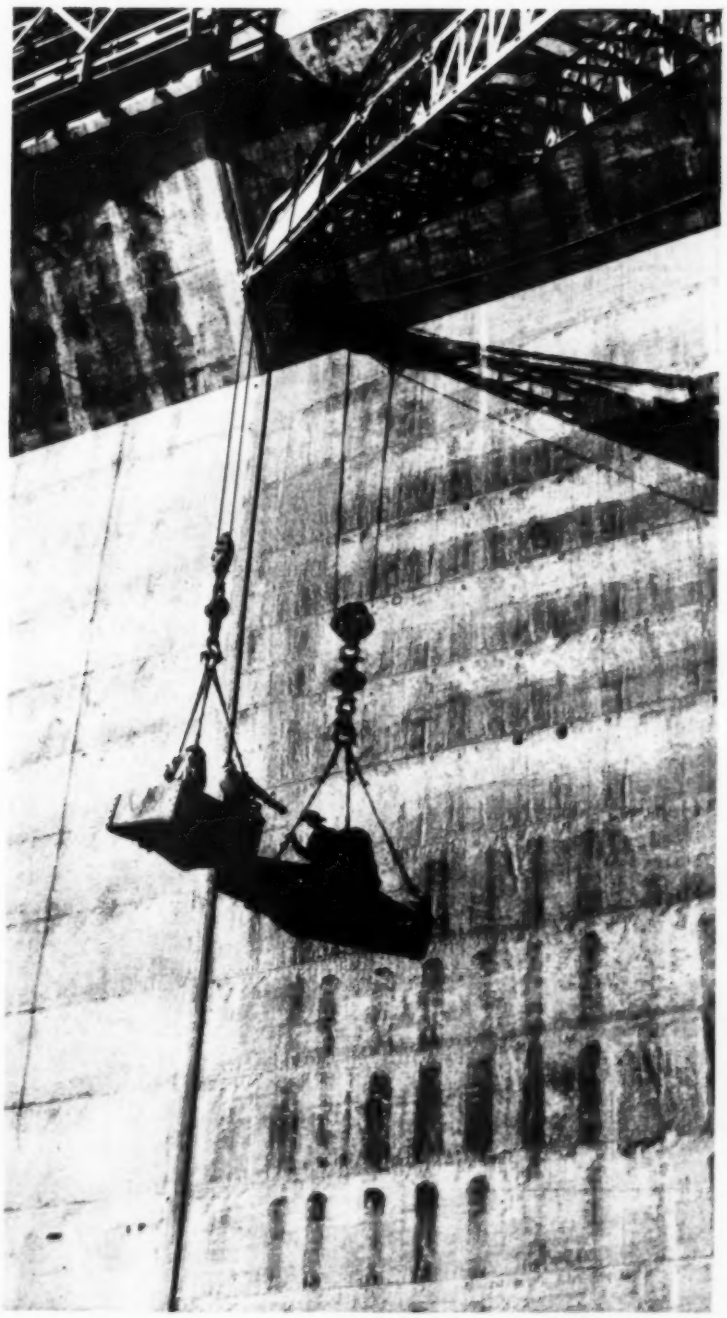


**IN EARLY HOURS** of Sunday morning, street car and vehicular traffic in 125th St. is shut off under El while wrecking crew removes double latticed girders in 60-ft. span across street.

# JOB oddities

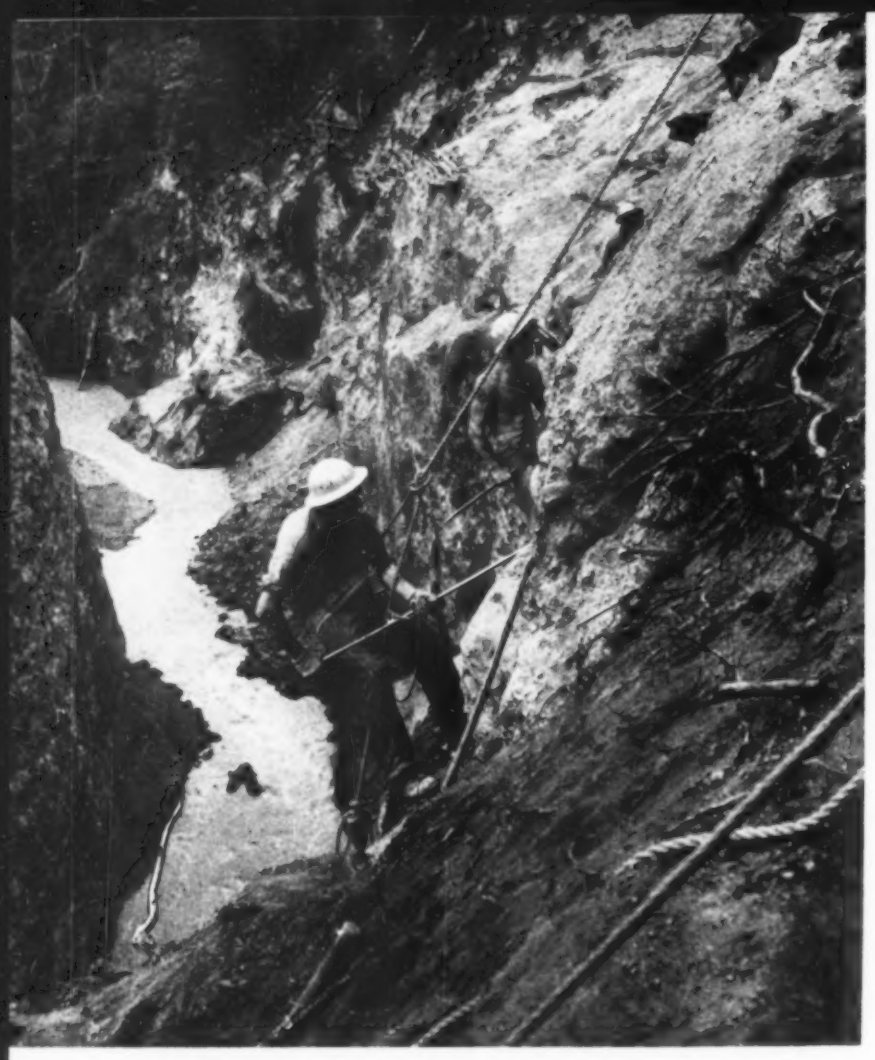
**LIKE BUCKING BRONCHO** this 16-cu. yd. truck equipped with Heil telescopic hoist and operated by Rohl-Connolly Co. on dam in Arizona, almost stood on end when rear wheels sank into soft material. Rugged construction of hoist on chassis withstood severe strain and truck, when righted, resumed normal operation.

**LAMINATED ARCH BRIDGE** of all-wood construction for pedestrian use has span of 73 ft. over Yabara River at Madison, Wis. Practical methods of gluing wood laminations together to act as unit and to form full-strength large wood members, developed by U. S. Forest Products Laboratory, make possible structure of this length. Ribs spaced 6 ft. on centers, are built up of normal 1x8-in. southern pine boards, surfaced two sides, scarfed and glued at ends to form full-length laminations. Depth of ribs increases from 15 in. at center to 30 in. at abutments. Rise of arch is 6 ft. 3 in. Arch ribs were made by Unit Structures, Inc., at Peshtigo, Wis.



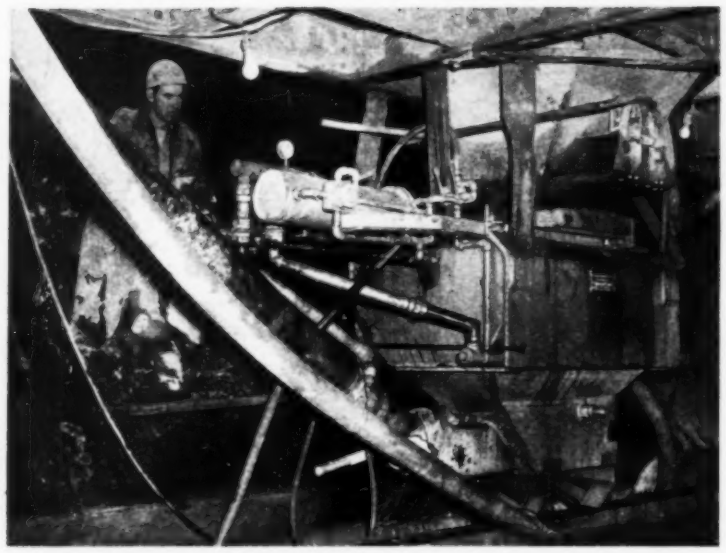
**HANGING BY THREAD** along concrete face of 550-ft. high Grand Coulee dam in Washington, skip maneuvered by American Revolver floating crane allows pair of workers for Consolidated Builders, Inc., equipped with chisels and patching materials, to smooth upstream face of giant U. S. Bureau of Reclamation structure across Columbia River.

**MAMMOTH TIRES** of 9-ft. diameter, each costing $3,214, carry diesel-powered Tournapull tractor which hauls carryall scrapers having capacity of from 23 to 30 cu.yd. of earth. These big pneumatic Firestone units are used on construction of Cherokee dam, Tennessee Valley Authority project on Holston River in East Tennessee.



**HIGH SCALERS** work on canyon wall 250 ft. above bottom of gorge near axis of dam. Wall in left background has been stripped preparatory to receiving rock and earth fill.

**SCAFFOLDS WERE PROVIDED (below)** for high scalers in clearing off practically vertical canyon walls, but some of this work had to be done by workers depending wholly upon safety belts.



**CONCRETE GUN** slung under jumbo in 23-ft. tunnel is used for placing concrete lining. Two Presswell units, each of 2-cu.yd. capacity, are in service.

# *Mud Mountain Dam*

## To Break World's Record For Height of Earth Fill

**A ROCK-FILL DAM** with a rolled earth core 425 ft. high is under construction on the White River, Wash., to control floods that have been periodically destructive in the White and Puyallup Valleys below. The dam is a U. S. Engineer Department undertaking for which a contract was let to the Guy F. Atkinson Co. in Sept. 1939 for $5,344,605. Since award of that contract, however, a change in design has been made. Instead of making the entire dam a rolled earth fill, the plan now is to make only the central core of rolled

**ON SPILLWAY FLOOR,** with steel reinforcement in place, concrete is discharged from bottom-dump bucket.

**IN 9-FT. TUNNEL** ventilation is accomplished by canvas pipe which, when collapsed, occupies minimum of space in tunnel where clearances are limited.

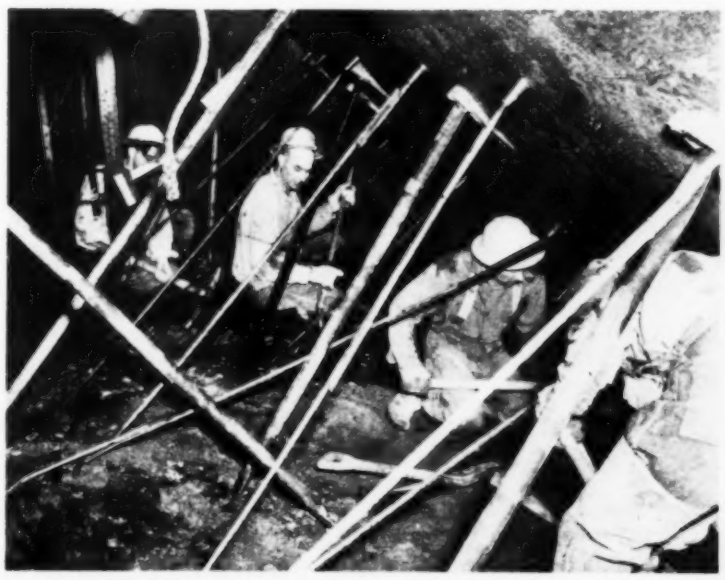
earth, flanked on either side by dumped-rock fill. To accomplish this modification in construction plan, the original contract was revised, striking out certain provisions and leaving others in effect to be supplemented by a cost-plus-a-fee agreement with the contractor covering the 1,539,000 cu.yd. of rock which will be brought in from a newly opened quarry some 3 mi. north of the site.

A striking feature of this job is the narrow box canyon through which the White River passes at the damsite. Two tunnels were driven through the right abutment, a 9-ft. bore which will be used to pass stream flow and a 23-ft. tunnel for discharging floods. The latter will have three 8-ft. steel pipes in its lower half to avoid putting the concrete lining under hydraulic head.

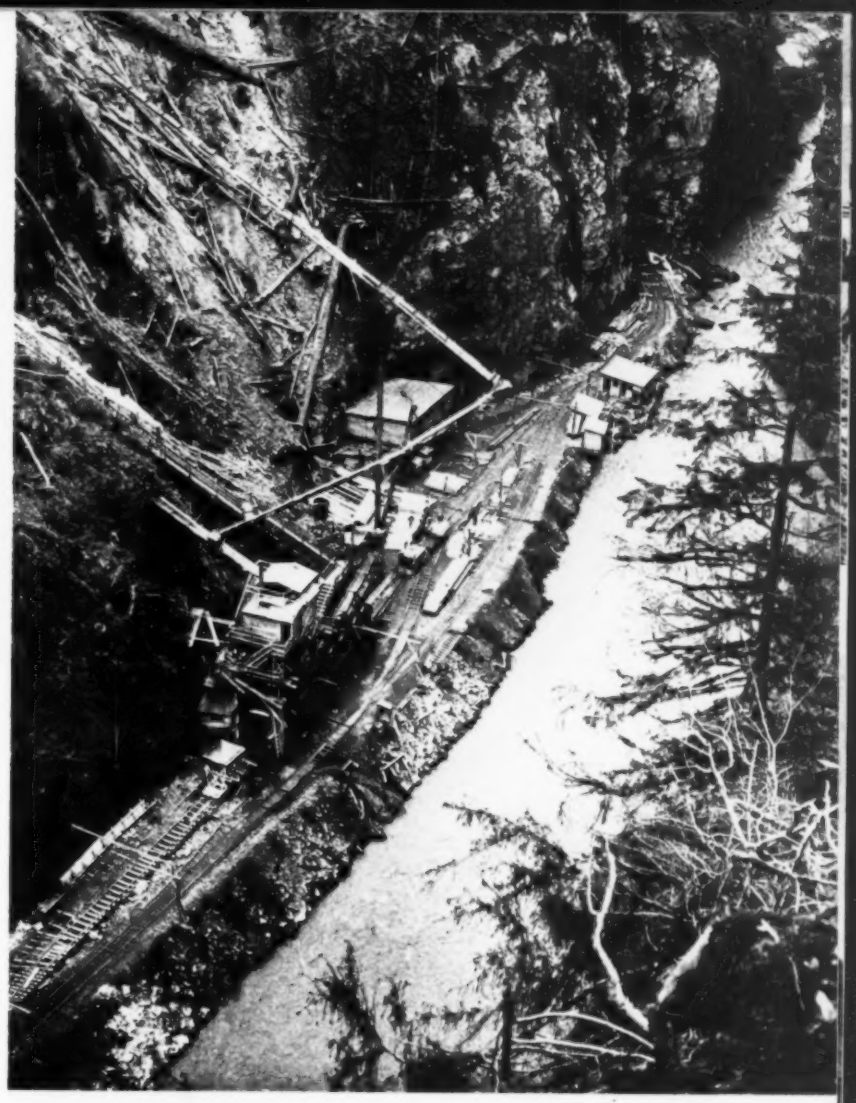
Spillway construction rates unusual attention on this job as special importance attaches to providing ample protection against overtopping this type of dam. The spillway capacity is figured as 139,000 sec. ft. or some five times the volume of flow in the maximum flood on record.

Those in charge for the U. S. Engineer Department include Col. Richard Park, division engineer, Col. B. C. Dunn, district engineer, Maj. Peter P. Goerz, construction engineer and Capt. James D. Lang, resident engineer.

For Guy F. Atkinson Co., Ray H. Northcutt is resident manager, D. E. Root, chief engineer and general superintendent and George W. Wintz, assistant manager.

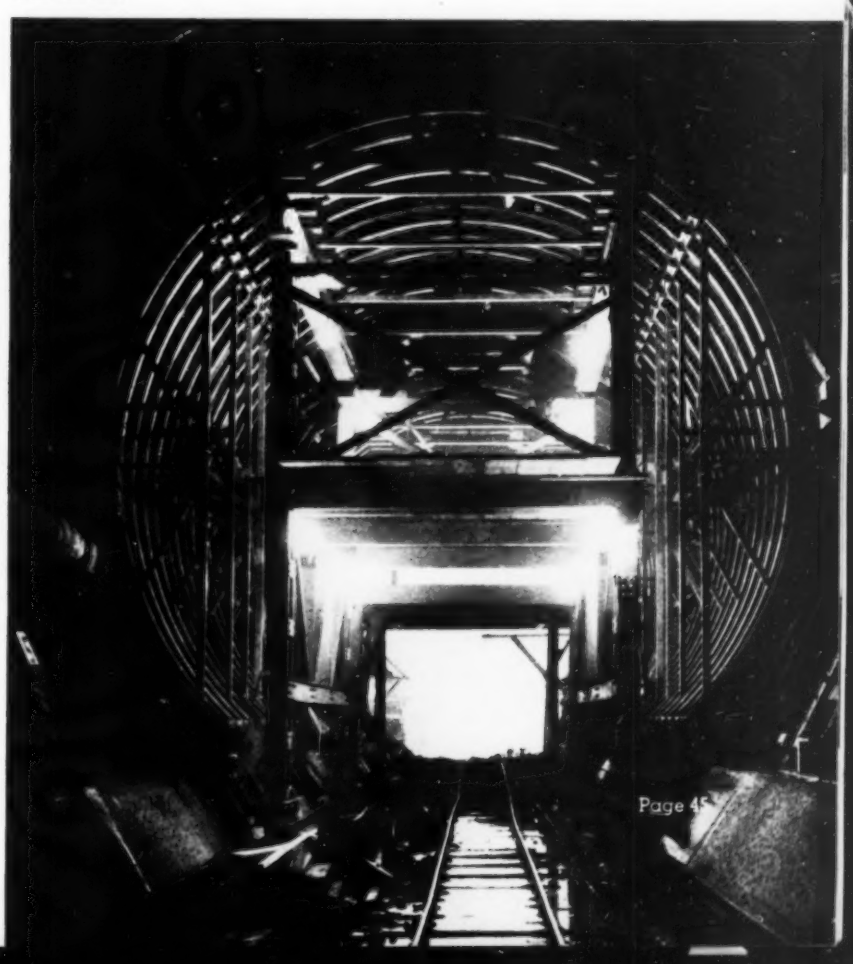


**LIMITED CLEARANCE** makes work difficult inside forms at footing of intake shaft.



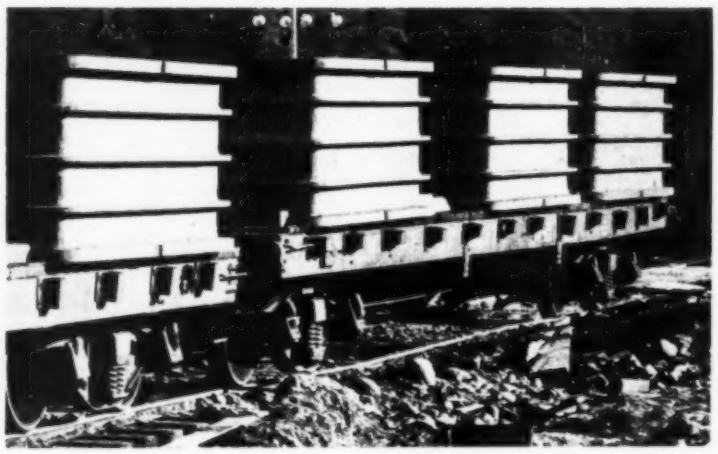
**LITTLE WORKING SPACE** is available in canyon bottom at Mud Mountain Dam. Downstream portal of diversion tunnel is right background. Structure in left foreground is agitating plant where concrete for tunnel lining is reconditioned after having been chuted down from mixing plant some 500 ft. above on canyon rim.

**IN 23-FT. TUNNEL (below)** steel lining forms were supported on wide-gage jumbo by rails carried on shoulder of concrete curbs. These curbs, which were first portions of concrete lining to be poured, were made extra heavy as incidental to changing from horse-shoe to circular section after tunnel was driven.



# Mud Mountain Dam (Continued)

**INTERIOR VIEW** of completed 23-ft. tunnel looking towards intake portal just before river was diverted.

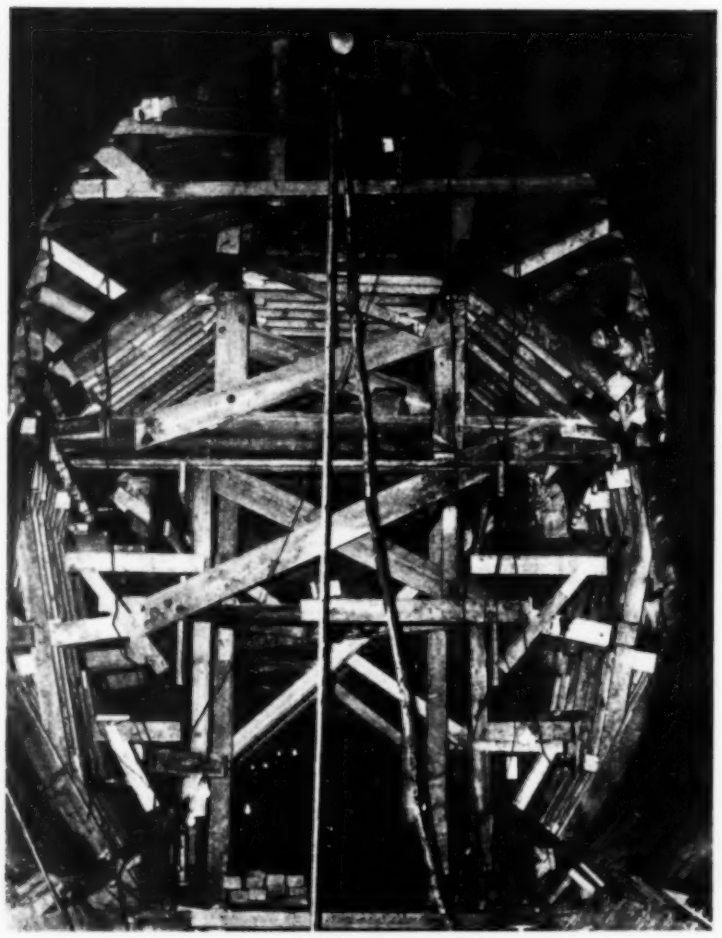


**RECTANGULAR CAST-IRON LINING,** brought to job in 4-ft. lengths on flat cars, will protect 87-ft. portion of 9-ft. tunnel ahead of control gate against erosion by debris carried in suspension after this part of tunnel becomes inaccessible. Sections, weighing about 14,000 lb. each, are rectangular to suit type of gate selected.

**CONCRETE PANELS IN FLOOR** are 30 ft. square and beneath them ample drainage capacity is provided by concrete pipes in trenches backfilled with gravel.

**CARPENTERS ARE SQUARING UP** 18x24-in. timbers in 25-ft. 8-in. lengths that serve as needles or stoplogs for emergency closure at intake portal of 23-ft. tunnel.

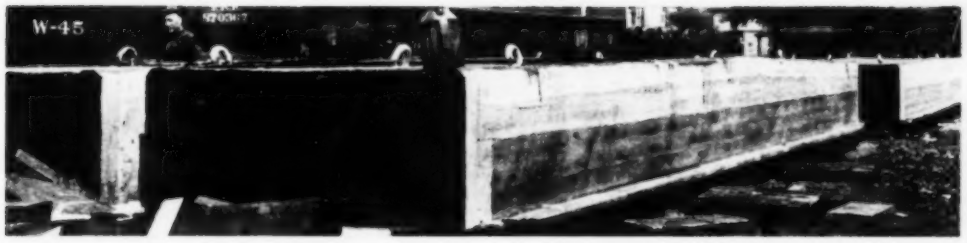
**SPILLWAY (below)** is concrete paved cut with capacity of 139,000 sec.-ft. Concrete is brought into cut in chute to hopper discharging into buckets on truck. Crawler crane delivers buckets to dumping points.



**INTRICATE FORM WORK** is involved at junction of 23-ft. tunnel and vertical intake shaft which constitutes permanent reservoir outlet.

# RAILROAD BRIDGES REPLACED WITH NEW

# *Prefabricated Spans*



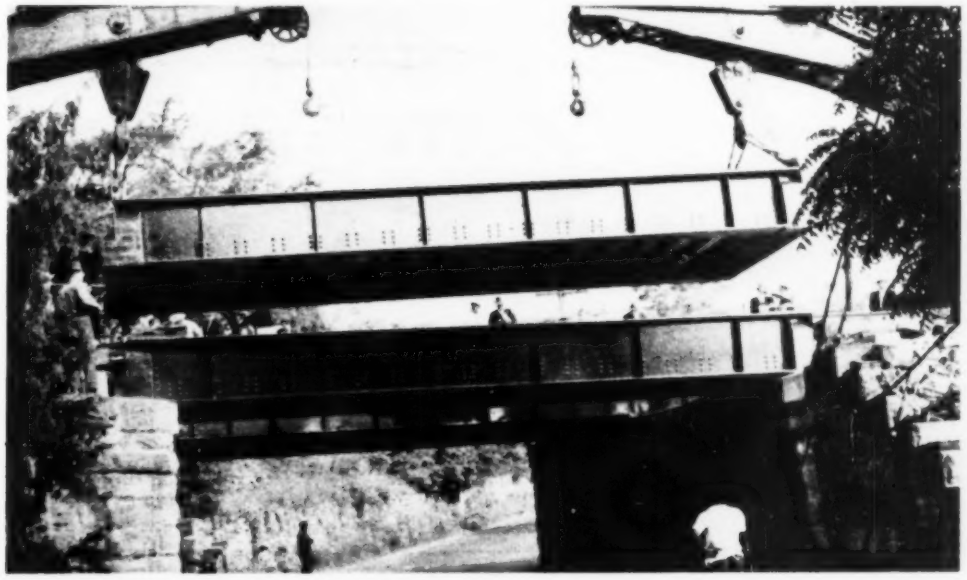

**PREFABRICATION** of new 80-ton concrete bridge units 6 ft. wide and 36 ft. long is done in railway yards at Bridgeport, Conn.

Photos, Paul Mitchell

**FLAT CARS ARE LOADED** with steel bridge span 12 ft. wide and 36 ft. long weighing 40 tons and supplied with ballast and ties.

**WITHOUT DISRUPTING TRAIN SCHEDULES,** the New York, New Haven & Hartford Railroad has been engaged upon a program of replacing with new structures of steel and reinforced concrete 16 existing bridges on its lines between New Haven, Conn., and the New York State line, serving an industrial area now busy on the production of equipment and supplies for national defense needs. The new steel and concrete spans are prefabricated in the West End railway yards in Bridgeport and transported on flat cars to points of placement, as illustrated in the accompanying photographs. The new bridge units have spans of 36 ft. and are fabricated in widths of either 6 or 12 ft. Placement is handled by a pair of heavy-duty railway wrecking cranes.

**SUPERINTENDENT** of railroad's New Haven division in charge of bridge replacement field operations is PAUL GOULETT.



**PAIR OF RAILROAD CRANES** picks new span from flat car and lowers it to place on abutments.

**SPEEDY PLACEMENT (below)** of new prefabricated spans by railway cranes causes minimum interference with main-line train movements.

# Concrete and Asphalt Runways

**FINE-GRADING MACHINE** cuts subgrade of 25-ft. lane to true cross-section profile and casts excavated material outside forms.

**TRANSVERSE EXPANSION JOINTS** are installed on 100-ft. centers, with transverse contraction joints at 25-ft. intervals between them.

**ON LOWER COURSE OF CONCRETE** struck off 2 in. below finished grade, workmen place reinforcing mesh weighing 42 lb. per 100 sq.ft.

**HOT-MIXED, HOT-LAID ASPHALTIC CONCRETE** for airfield pavement is placed by self-propelled finishing machine which pushes truck ahead of it as material is discharged into hopper.

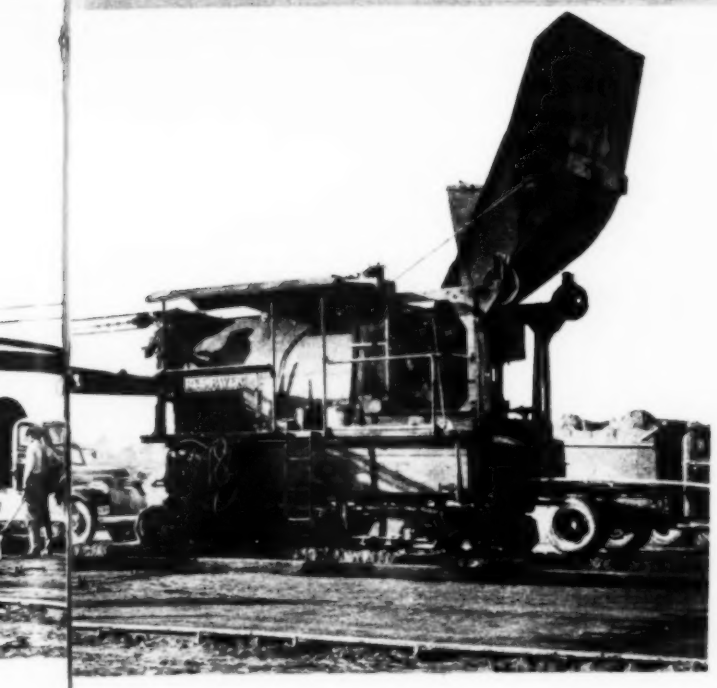
**34E DOUBLE-DRUM MIXER** traveling outside form line deposits concrete across 25-ft. lane to be struck off by finishing machine.

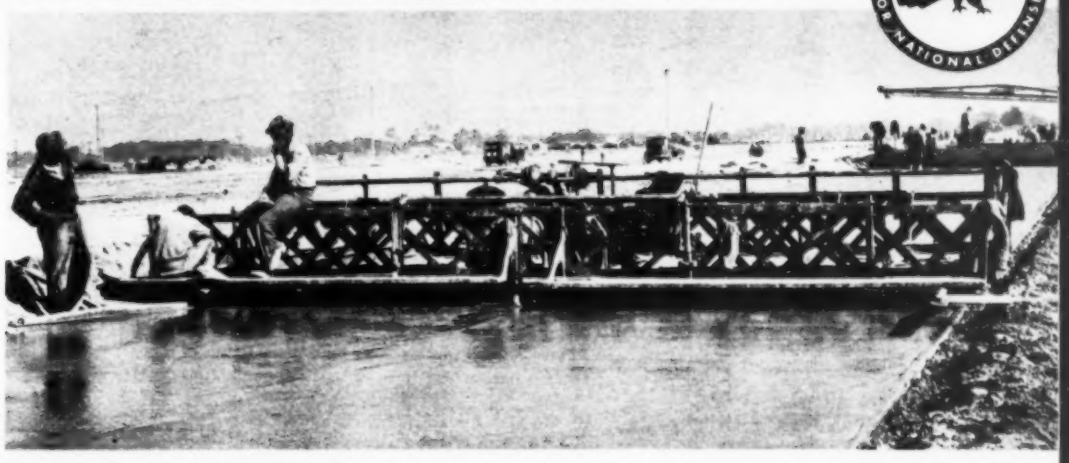
**WORKING UNDER PRESSURE OF RUSH SCHEDULES,** contractors for the Navy Department have made rapid progress in laying airfield runway pavement of two types adapted to different foundation conditions at the Norfolk Naval Air Station and the Quantico Marine Base, in Virginia. On dry sand and loam subgrade at Norfolk, the Virginia Engineering Co., Newport News, Va., during the fall placed 4,000 sq.yd. per day of reinforced-concrete slab with a 34E dual-drum paver which worked about 10 hr. a day 7 days a week. At Quantico, the Atlantic Bitulithic Co., Washington, D. C., placed hot-mixed, hot-laid asphaltic concrete on a dry-fill earth mat covering a soft foundation of hydraulic fill; a large area of the earth blanket had been stabilized the previous year by processing with asphalt emulsion. Operating two mixing plants, this contractor laid up to 1,500 tons per day when working three 8-hr. shifts.

*Concrete Runways* — Airfield construction is an important item of the Virginia Engineering Co.'s large cost-plus-a-fixed-fee contract for the Norfolk Naval Air Station. Paving of the airfield involves 350,000 sq.yd. of reinforced-concrete slab in three runways constructed for the present to a normal width of 250 ft. with provision for future widening to 500 ft. The entire contract calls for a total of nearly 800,000 sq.yd. of concrete pavement, in addition to a large amount of heavy construction.

Runway pavement is placed in 25-ft. lanes of 7-5-7-in. cross-section, reinforced 2 in. below the surface with 42-lb. mesh. Keyed construction joints without tiebars are used between lanes, except at the center line of each 250 ft. runway, where a 1-in. expansion joint is installed. Each 25-ft. lane has a longitudinal dummy contraction joint in its center line. Transverse doweled expansion joints are spaced on 100-ft. centers,

# FOR NAVY AIRFIELDS





**INSTALLING FILLER MATERIAL** in 2-in. slots for dummy contraction joints, self-propelled joint machine travels on steel edge forms.

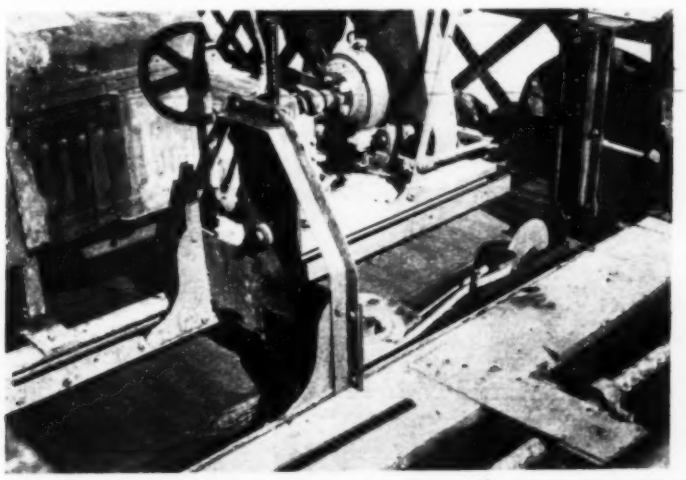
**TWO CRANES** at railroad batching plant handle sand gravel out of gondola cars into stockpiles or overhead steel bin under which trucks back for loading.

and doweled transverse contraction joints are installed on 25-ft. centers between expansion joints.

Standard paving practice on the job calls first for completion of alternate 25-ft. lanes, with the intermediate lanes being paved later. During the fall, batched materials were delivered to the paver by trucks hauling from a batch plant set up beside a spur track on the site for railroad delivery of sand, cement and gravel. For the bulk of the paving on the job, the contractor planned to shift the batching to a waterside plant, about 2 mi. from the field, where materials can be unloaded from barges. A batch of 38-cu.ft. volume was put through the Rex 34E double-drum paver. Heltzel 7-in. steel forms totaling 5,000 lin.ft. in length are provided to take care of a full day's production when the double-drum mixer is joined by a Ransome 34E single-drum paver. A single-drum unit of this capacity has been selected to take batches of the same

*(Continued on page 89)*

**ROLLING OF HOT ASPHALTIC PAVEMENT** is carefully controlled to prevent intrusion of any seepage from high groundwater table.



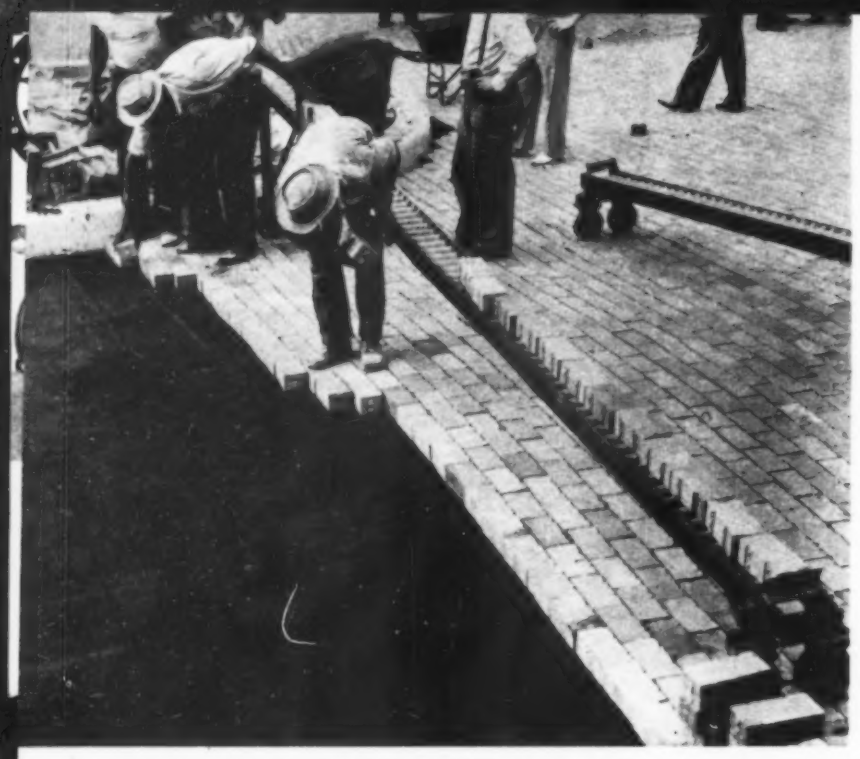
**CUTTER DISK (below)** and filler strip for longitudinal center-line contraction joint are mounted on joint machine, which feeds joint filler into slot as unit moves forward.

**PAIR OF ASPHALT MIXING PLANTS (below)** handling 3,000-lb. and 1,000-lb. batches produces materials in large volume for rapid airfield paving.

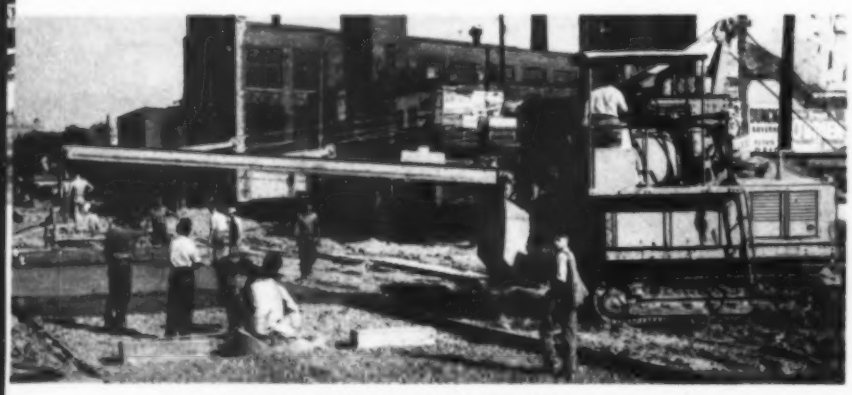
# Brick Surface on Concrete Base FOR DETROIT STREET WIDENING

By WILLIAM H. HARVIE
*Road Engineer,*
*Michigan State Highway Department*
*Lansing, Michigan*

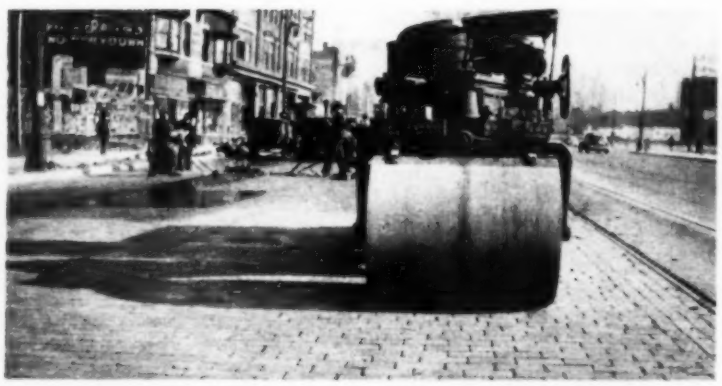
WILLIAM H. HARVIE



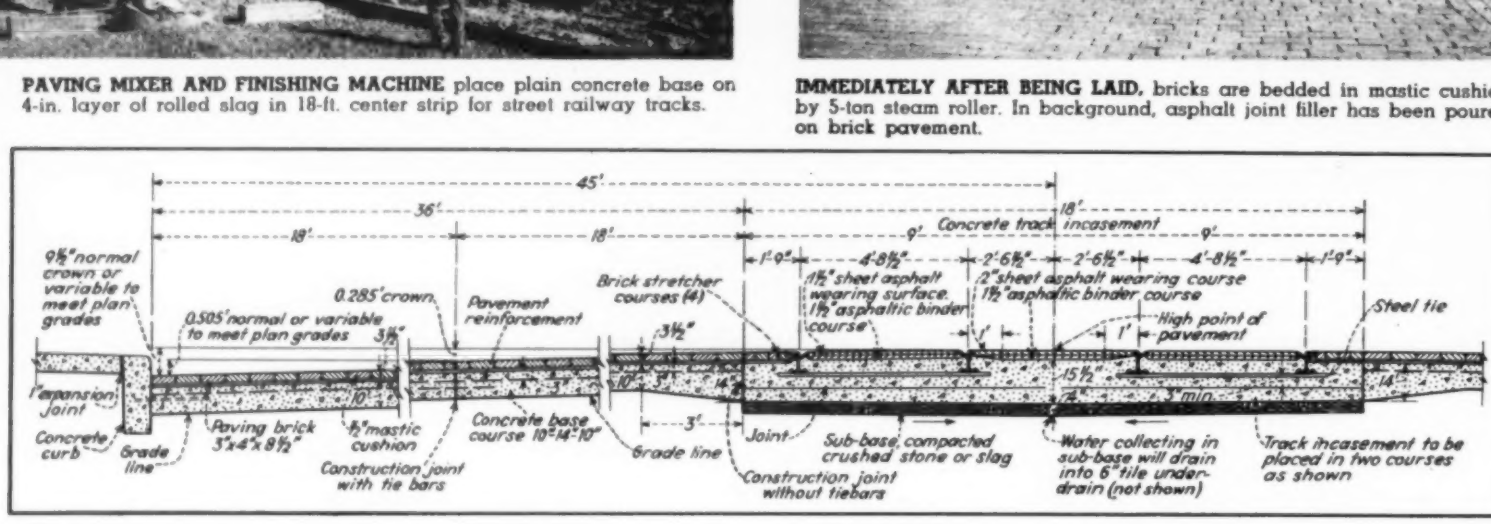
**DE-AIRED VITRIFIED PAVING BRICK** of vertical fiber wire-cut type, with lugs to assure correct joint spacing, are laid three courses at a time across width being paved.



**PAVING MIXER AND FINISHING MACHINE** place plain concrete base on 4-in. layer of rolled slag in 18-ft. center strip for street railway tracks.



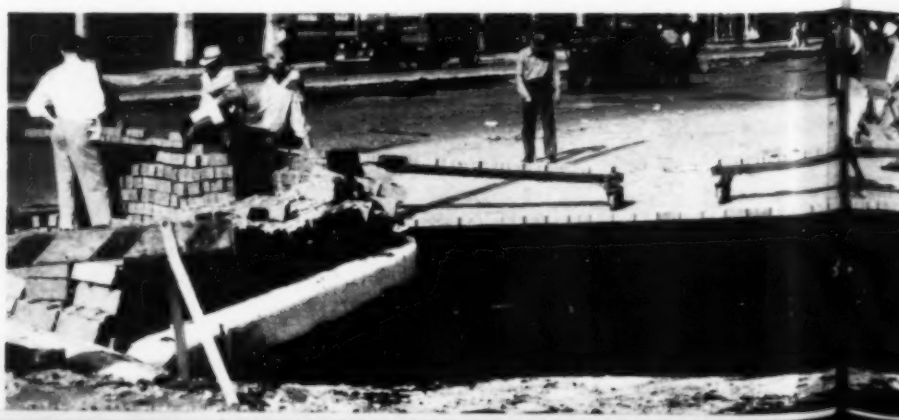
**IMMEDIATELY AFTER BEING LAID,** bricks are bedded in mastic cushion by 5-ton steam roller. In background, asphalt joint filler has been poured on brick pavement.




**SAND-MASTIC CUSHION (below)** is struck off to ½-in. depth by template riding on compensating dollies equipped with thin disk wheels.

**90-FT. PAVEMENT** on widened Michigan Ave., Detroit, consists of 10-14-10-in. reinforced-concrete base and brick surface, except in center strip carrying street railway tracks. This strip has special concrete base and track incasement surfaced between rails with sheet asphalt on asphaltic concrete binder course.

**TWO ROLLER CONVEYORS (below)** serve three brick droppers laying average of 62,000 brick on 1,700-sq.yd. of pavement in 8 hr., when working on straight runs.



**TAKING LONG STRIDES** during the last year toward completion of a widening and reconstruction program for main trunk routes radiating from the heart of downtown Detroit, the Michigan State Highway Department as one step in the program widened and paved an 0.878-mi. section of Michigan Ave. under contracts executed by the Weir Construction Co. and the Cooke Contracting Co., both of Detroit. In conformity with a pavement design adopted as standard for all reconstruction on this avenue, the first contractor placed concrete incasement for two street railway tracks and constructed reinforced-concrete base for the remainder of the new 90-ft. width between curbs; on these concrete foundations the second firm laid brick surface from the curbs to the outer rails of the tracks and paved between the rails with sheet asphalt. The brick pavement, by virtue of improved and carefully controlled construction methods, possesses riding qualities equal to the best obtainable with any hard surface type. Because of its durability, the brick surface is expected to give continued service well beyond the lifetime of the men who built it.

Within cities the Michigan State Highway Department generally follows the policy of building concrete base with a surface course of either brick or sheet asphalt. The selection of the surface depends upon traffic and grades, plus a consideration of which type is best adapted to uniform maintenance by the city.

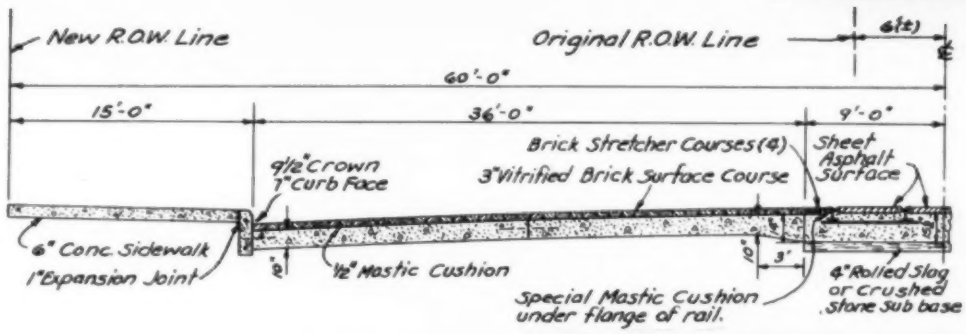
*(Continued on page 54)*

**HAND LUTING** is necessary on ½-in. sand-mastic cushion at intersections, where disk-wheeled strike-off template cannot be used.

**PRESSURE SPRAY** hooked up to hand pump in wheel-mounted barrel applies calcium chloride-starch solution to brick surface before joints are poured with hot asphalt filler. Sprayed solution prevents filler from adhering to top of brick.

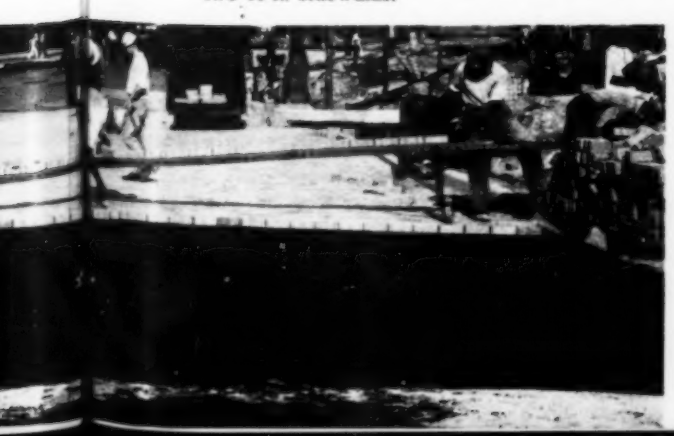
**GRATIOT AVE. WORK,** on which track incasement photographs were made, is supervised by L. H. BRENNER (at right), project engineer, assisted by: (in order, from right to left) CHARLES De COSMO and JOHN ROBINSON, paving inspectors, and L. E. KIMBALL, instrumentman.

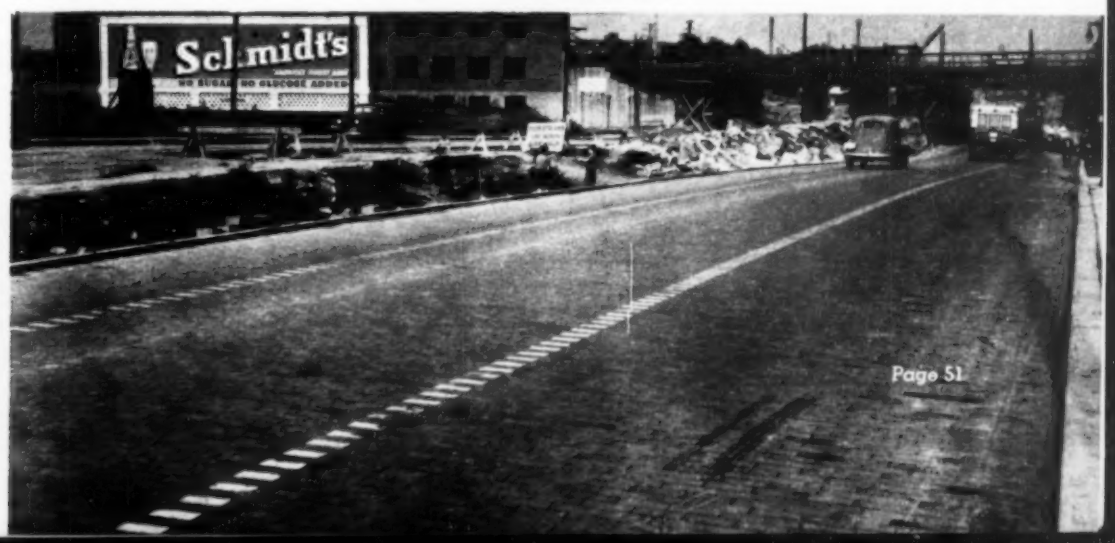
**BEFORE ASPHALT COOLS,** excess filler is stripped from brick pavement surface and returned to kettles, where it is blended with fresh asphalt.




**BUFF MARKER BRICK (below)** set in pavement provide permanent traffic guides on another section of Michigan Ave. where street passes under overhead bridges.

**RIGHT-OF-WAY,** widened to 120 ft. through acquisition of about 54 ft. of additional land, provides for 90-ft. paved width between curbs and two 15-ft. sidewalks.

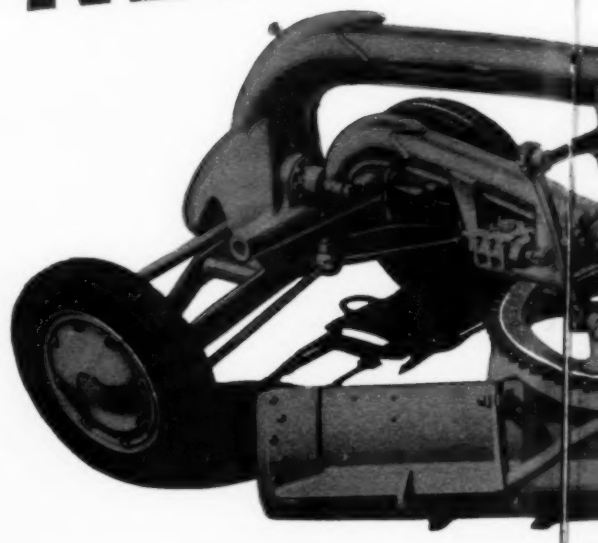




# *Extra*

# EARTH-MOVING CAPACITY..

**NEW MODEL A-D**



**75 DIESEL HORSEPOWER**

## *Capacity* TO CUT AND ROLL DIRT FASTER, EASIER, CHEAPER...

**Here is a NEW motor grader—built the way you want it—with more time-saving, money-saving, profit producing features than you ever thought possible. It's more powerful, more versatile, stronger, faster ... easiest handling machine you've ever seen!**

EXTRA AXLE CLEARANCE— A full six inches of *extra* clearance under the front axle enables you to handle windrows twice as large as ever before—to straddle heaping windrows without hanging up ... without wasting power ... without wasting fuel ... without decreasing travel speeds.

EXTRA THROAT CLEARANCE— Plenty of clearance between blade and circle adds extra earth moving capacity. Heaping loads roll off blade freely without jamming up in the circle—no bulldozing action ... no power loss ... no frequent blade adjustments.

EXTRA POWER— Powered by a smooth 75 h.p. 2-cycle Diesel with a world of power to handle your jobs faster than ever before. It's ***smooth*** power that cuts your fuel bill—that eliminates costly vibration—that digs in and hangs on when the blade bites deep. It's the kind of power you've always wanted—simple, sturdy, smooth and thrifty.

FULL BLADE RANGE— Put it on your toughest job. Handles high bank cuts ... hard ditch cuts ... heavy oil mixing

DEL
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# FOR HEAVY CONSTRUCTION *and Grading*

EL
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21,500 LBS.

## PER ... FREEDOM FROM WINDROW HANG-UPS

pacity.
g up in
. . . no

2-cycle
faster
ur fuel
in and
power
thrifty.

st job
mixing

—all with equal ease. Operates forward or reverse. Blade positions and adjustments made quickly, easily, accurately.

WIDE SPEED RANGE— Operate at the exact speed desired for construction, maintaining, snow removal or travel. In addition to transmission speed changes, throttle engine control gives you a still greater selection of practical working speeds from 1.5 to 16.6 m.p.h. Get your jobs done on *time* and at a *profit*.

**Before you buy any motor grader get the facts on this remarkable new machine. Find out *how* it will cut your costs—*why* you cannot afford to operate without one. See your Allis-Chalmers dealer... NOW!**

ALLIS-CHALMERS
TRACTOR DIVISION—MILWAUKEE, U.S.A.
POWER
IT DOESN'T COST.. *it Pays!*

**CONCRETE TRACK INCASEMENT** is placed by paving mixer around rails blocked and braced to line and grade. Blocking and bracing are removed before concrete is deposited.

**TWO TRACK VIBRATORS** taking electric power from trolley wires vibrate concrete around rails. Small gasoline-powered flexible-shaft vibrator (carried on one of track machines) consolidates concrete along steel edge forms. Note track bracing from granite blocks set in concrete base.

**D. C. MOTOR** on track vibrator turns horizontal shaft driving two bullet-nosed vertical plungers, each about 1 ft. in diameter, imparting 1,200 vibrations per minute to concrete. Four machines of this type are operated by Detroit Street Railways on track incasement work.

**SPECIAL SCREEDS** strike off concrete between rails to desired contours.

**SCORING TOOL** fitted with ⅜-in. rods on 2-in. centers cuts grooves in concrete surface between rails for stronger bond with asphaltic concrete binder course.

**MICHIGAN AVE. WIDENING PROJECT** is directed for State Department of Highways by A. W. KIRCHHOFF, project engineer.

**SUPERINTENDENT** in charge of brick and asphalt paving for CookeContracting Co. is J. H. HOHNKE.

*Genesis of Program*—On June 30, 1930, the Michigan State Highway Department entered into a contract with the city of Detroit to widen and reconstruct several main trunk lines. Little physical work was done from 1930 to 1933. When State Highway Commissioner Murray D. Van Wagoner (now governor of Michigan) took office in 1933 he pushed the program ahead. Woodward Ave. (U.S. 10), Gratiot Ave. (U.S. 25) and Michigan Ave. (U.S. 112) are in final stages of completion.

Michigan Ave., originally a stage coach trail, is now the main trunk line between Detroit and Chicago and is one of the important industrial roads leading westward toward the latter city. The importance of this highway in Detroit is emphasized by the traffic density of upwards of 25,000 vehicles daily. Improvement of Michigan Ave. and the other arterial routes in Detroit has redoubled significance today, when these highays are carrying a large volume of traffic generated by the national defense effort.

### Preliminary Work

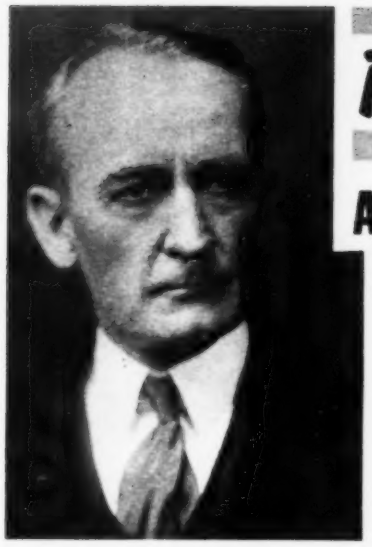
Prior to widening, Michigan Avenue was in extremely poor condition. The street was narrow (50 ft. between curbs), with capacity for little more than one lane of traffic on either side of the street car tracks. Narrow right-of-way width was the greatest single obstacle to the reconstruction program. The city of Detroit, through the courts, condemned all necessary additional right-of-way. After these legal requirements had been fulfilled and the State Highway Department had turned over 50 per cent of the cost of right-of-way to the city, as per agreement, the Department was given permission to take possession of the acquired land. Demolition of existing structures to the new building line was handled by the Department of Public Works, City of Detroit.

As soon as the buildings had been demolished, the various utility companies

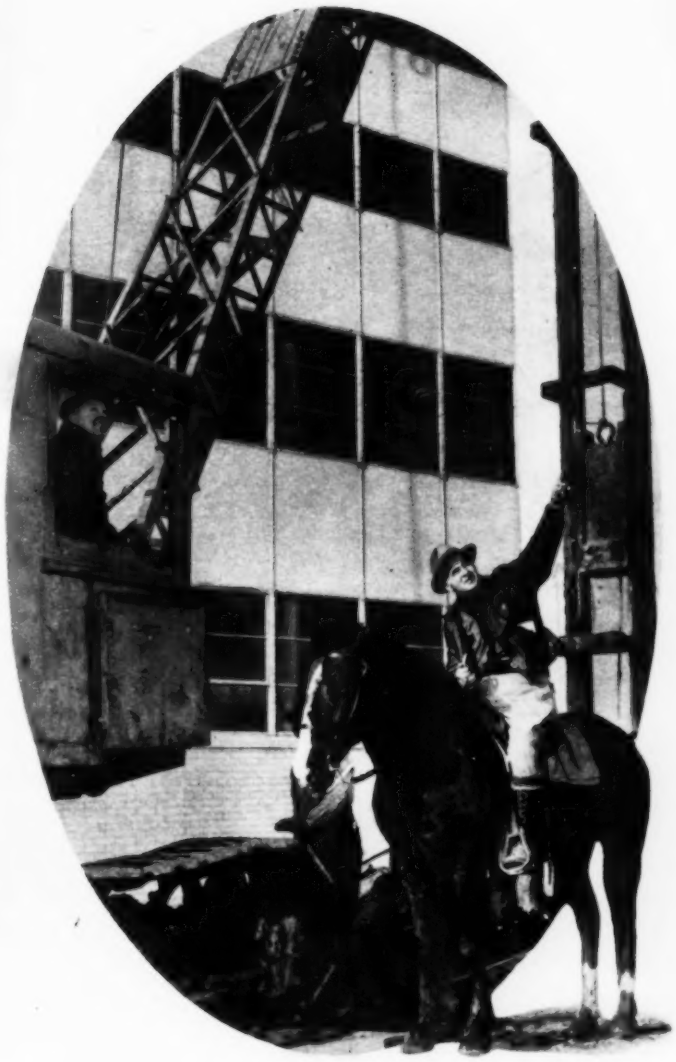
*(Continued on page 93)*

# *Present and Accounted For*

## A PAGE OF PERSONALITIES



**M. E. GILMORE,** of New York, former regional director for PWA, has been appointed Commissioner of Public Works by John M. Carmody, Federal Works Administrator.



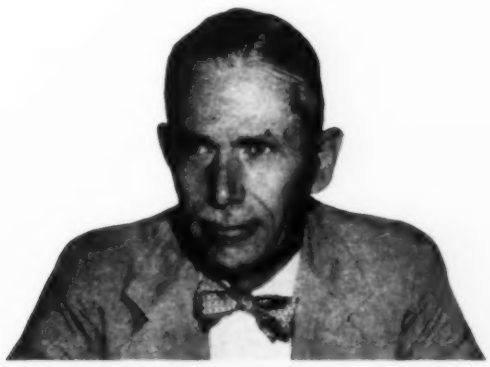
**H. W. COLLISON,** in his capacity of construction superintendent for The Austin Co., engineers and contractors, on huge plant expansion program now under way for Boeing Aircraft Co. at Seattle, Wash., covers 42-acre job on horseback.

**JACOB CRANE,** formerly assistant administrator of U. S. Housing Authority, has resigned to accept appointment as assistant to Charles F. Palmer, defense housing coordinator for President's Advisory Defense Commission.

**RUSSELL G. CONE,** engineer, Golden Gate Bridge and Highway District, San Francisco, is 1940 winner of construction engineering prize offered by Construction Division of American Society of Civil Engineers. He received award for paper "Field Practice," with special reference to Golden Gate bridge. Mr. Cone has been named member of board to investigate and report on recent Tacoma Narrows bridge failure.

**G. DONALD KENNEDY,** formerly business manager and deputy commissioner in charge of administration, is newly appointed state highway commissioner of Michigan, succeeding Murray D. Van Wagoner who was elected governor of state last November. Commissioner Kennedy's past experience includes municipal construction of various kinds, including Pontiac (Mich.) municipal airport.

**LIEUT. COL. EDMOND H. LEAVEY,** Corps of Engineers, U. S. Army, has been selected by Lieut. Col. Brehon B. Somervell to head engineering sections of recently reorganized construction division of Quartermaster Corps. He will have charge of contract letting for defense construction projects.



**LIEUT. COL. BREHON B. SOMERVELL,** Corps of Engineers, U. S. Army, formerly on leave as WPA administrator in New York City, has been chosen to head construction division of Quartermaster Corps, succeeding Brig. Gen. C. D. Hartman, and will direct big program of Army cantonment and other construction for national defense, now in progress. Organization changes in construction division will include decentralization of authority with responsible officer empowered to make decisions in each of the nine Army Corps areas.

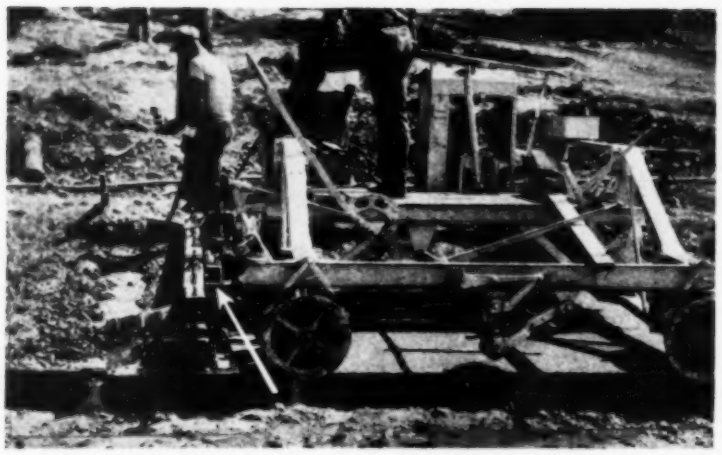
**COL. LESLIE R. GROVES, JR.,** Corps of Engineers, U. S. Army will head operations section of newly reorganized construction division of Quartermaster Corps, in charge of defense construction under Lieut. Col. Brehon B. Somervell. He will direct carrying out of construction contracts after they are awarded.

# HOW They Did It

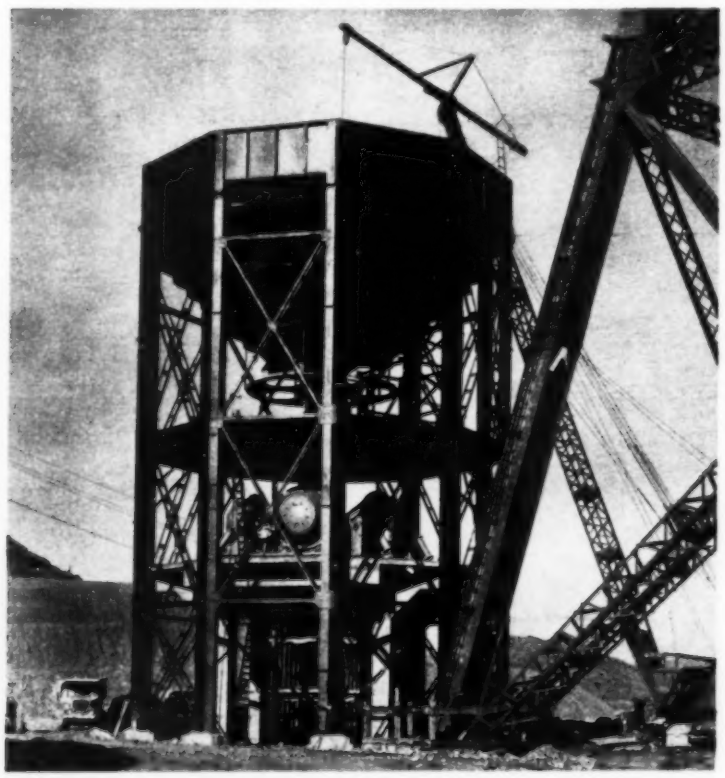
## CONSTRUCTION DETAILS

### For Superintendents and Foremen

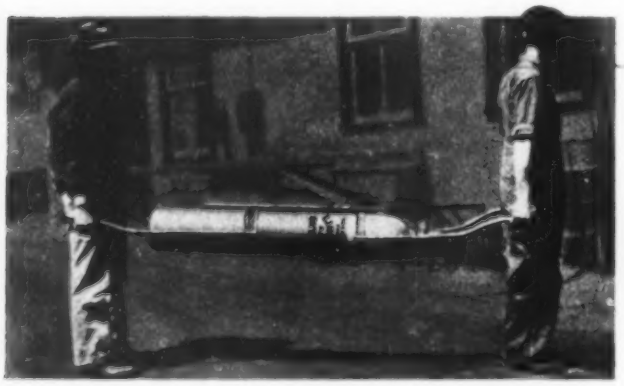
**FABRICATED TIMBER FALSEWORK** is handled into position by deck traveler to support girders 12 ft. deep in 270.8-ft. span across New York Central and Pennsylvania tracks for Lakefront Ramp link of Lakefront Road, new east-west express highway skirting lake shore in Cleveland. Bridge, fabricated and erected by Bethlehem Steel Co., is longest completed plate girder span in American hemisphere.



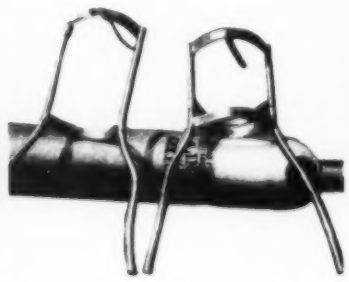
**VIBRATING SCREEDS** on finishing machines for concrete pavement are used by three Pittsburgh contractors, McCrady-Rodgers Co., Frank Manella & Sons Co., and Nardulli & Sons Construction Co., to increase workability of concrete and produce dense, impervious mix. Syntron vibrating units, powered by small a.c. engine-generator set on machine, are mounted in horizontal plane on back of screed. Outfit makes two passes over pavement surface, the first pushing excess concrete into voids and pockets and the second applying smooth finish to surface.



**SHASTA DAM CONCRETE MIXING PLANT** erected by Pacific Constructors, Inc., contractor for U. S. Bureau of Reclamation, utilizes C. S. Johnson concentric batching and mixing system with five Koehring 4-yd. mixers, which supply concrete to two standard-gage railroad cars, each carrying two 8-yd. hoppers. Track is laid in circle around head tower, one leg of which may be seen, and hoppers on railroad cars dump into buckets of equal capacity carried by seven cableways radiating from head tower.

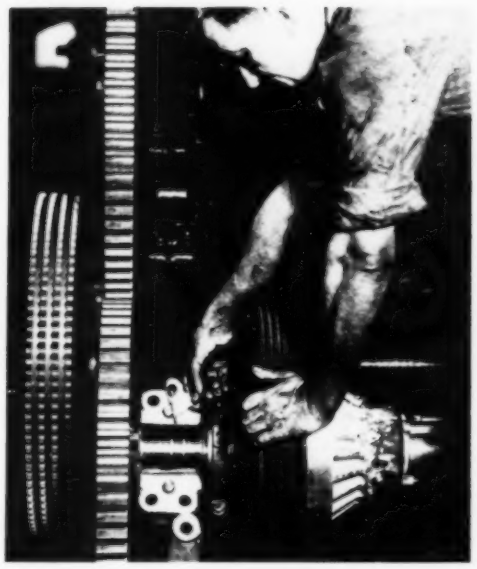


[Photos, The Linde Air Products Co.



**CARRIERS MADE OF PIPE AND STRAP IRON** enable two men to transport oxygen or acetylene cylinders with ease. Used also in handling pipe, carriers are inverted and placed inside pipe for diameters greater than 6 in.

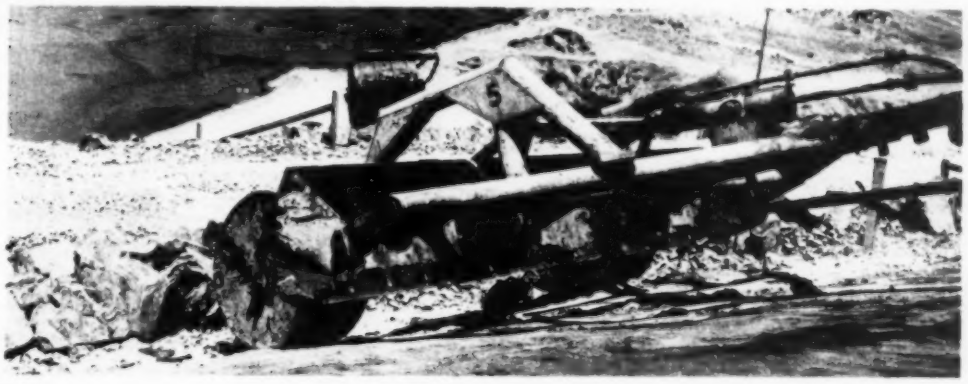
**HOPPER-TYPE WELDED STEEL TRAILERS** of 30-ton capacity, fabricated by Landis Steel Construction Co., Picher, Okla., of 8-gage Mayari-R steel with Lincoln shielded-arc equipment, haul gravel in Tri-State mining field around Picher.

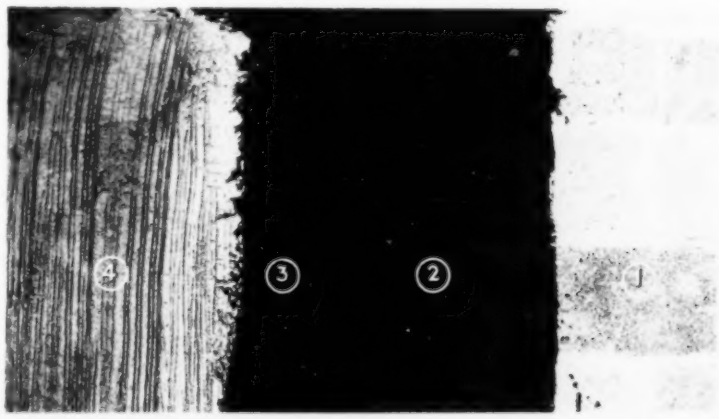


**QUICK, ACCURATE ADJUSTMENT** of shaft bearings in Lorain shovel is accomplished by means of laminated shims installed in original assembly. Photo, Laminated Shim Co., Inc.

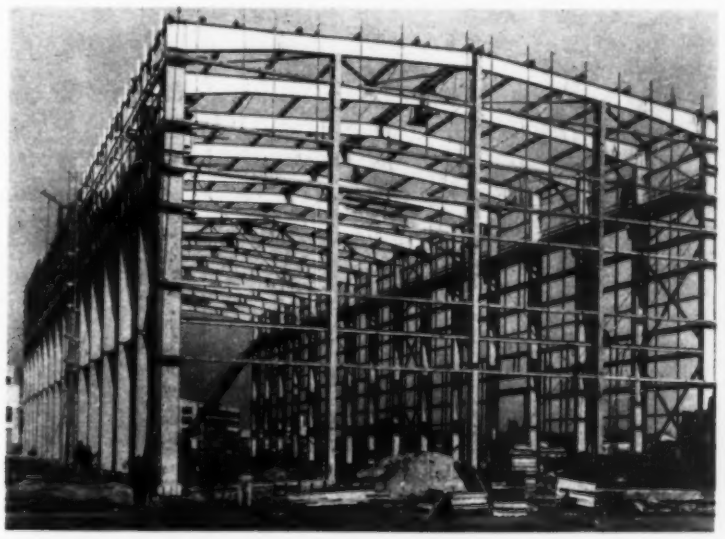
**STEEL PENTHOUSES** on industrial buildings to meet current demands for increased office and plant space provide fully insulated, plaster-finished walls rarely exceeding 18 lb. per square foot in weight. Complete Steelox walls can be further lightened to about 7 lb. by paneling with plywood or other prefabricated materials. Roof assembly is said to save 10 to 15 lb. per square foot of ceiling over conventional types of roof construction. Interlocking flange construction permits quick assembly, as channels are simply slipped together for bolting or welding to supports.

**SLOPE TRIMMER (right)** of job-made construction smooths surface of embankment on upstream face of Prado Dam in California. Device operated by Shirley-Gunther-Callahan-Marsh organization, contractor, has blade actuated by two-way valve, conveniently at hand of tractor operator, controlling air ram.





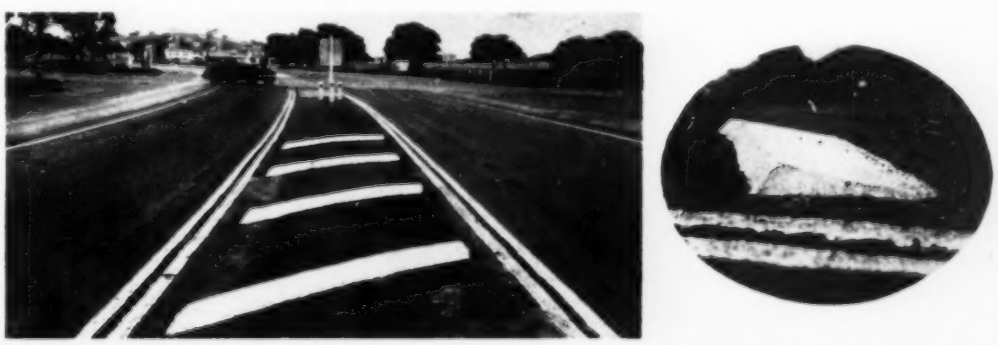

**DAMPPROOFING TO USHA STANDARDS** comprising: (1) raw concrete block wall (2) asphalt primer applied with spray; (3) mastic material applied with trowel, and (4) scratch coat plaster, successfully undergoes rigorous test on three projects of Housing Authority of Savannah, Ga., according to W. H. Stillwell, executive director, when newly erected walls satisfactorily withstand 1-in.-an-hour rainfall, driven for 14 hr. before hurricane reaching at times a velocity of 80 to 90 mi. an hour. Mastic, a plastic compound consisting of asphalt and asbestos, is troweled on to thickness of 3/32 to 1/8 in. over spray coat of asphalt primer, applied in an amount of not less than 1 gal. per 100 sq. ft. of clean, dry, wall surface in which all mortar joints have been carefully filled flush.



**TWO-HINGED WELDED RIGID FRAMES** connected across base by tierods under floor between two legs of each bent are erected on 20-ft. centers for 100x600-ft. sub-assembly building in contract of Ralph S. Herzog, Philadelphia, with Bureau of Yards and Docks, Navy Department.

U. S. Navy Photo

Use of welded construction eliminates projections on inner surfaces, facilitating clean dumping of gravity-unloading equipment. Two hopper doors, controlled from cab of truck, may be operated simultaneously or individually.



**RAISED WHITE BARS** prove effective in controlling and guiding California traffic and preventing accidents at intersections, wyes, and neutral strips on divided highways. Angled and raised to insure high visibility, these whitened bars are so laid by California Division of Highways as to constitute visual warnings of approaching hazards. Bars are laid at angle of 45 deg. to highway center line and are not less than 6 in. wide, with far face higher than near face.

# *Small Bore Tunnel*
# PIERCES CONTINENTAL DIVIDE

**THROUGH THE CONTINENTAL DIVIDE** in northern Colorado a rock tunnel, to be 9¾ ft. in finished inside diameter when lined with concrete, is being driven by the S. S. Magoffin Co., of Englewood, Colo., for the U. S. Bureau of Reclamation in order to deliver water for purposes of irrigation and power development from the west to the east slope of the Rocky Mountains. The ultimate length of this bore, which will divert headwaters of the Colorado River, will be 13.1 mi., but the present contract covers only 8,000 ft. being driven from the east portal under a $471,123 contract, which does not include the concrete lining. The unit price bid for the estimated 38,100 cu.yd. of rock excavation in tunnel is $9.33 per cubic yard.

The tunnel is one of the main features of the Reclamation Bureau's $54,000,000 Colorado-Big Thompson project, involving five reservoirs, six power plants and two pumping plants in addition to the water-diversion tunnel. The 13.1-mi. bore, incidentally, is claimed to be the longest in the world driven only from two portals, without adits or shafts. Its cost is estimated at about $10,000,000. The east portal is at an elevation of 8,250 ft. above sea level.

The following notes regarding the methods and equipment used in driving the Continental Divide tunnel are from a memorandum prepared by F. R. Purvis, general superintendent in charge of the work for the S. S. Magoffin Co.

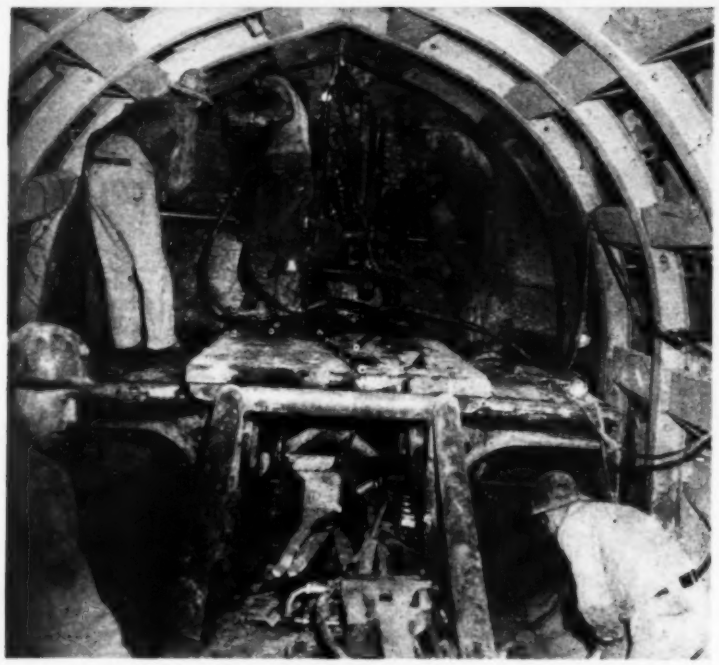
### Tunneling Progress

Started to build and set up machinery May 20, 1940.
Faced up portal June 13.
During the rest of June, 275 ft. was driven; lack of equipment on hand slowed progress.
Monthly tunnel-driving progress was: July, 932 ft.; August, 1,113 ft.; September, 1,041 ft.; October, 1,147 ft.; November, 922 ft.; December, 1,135 ft.; Jan. 1 to Jan. 17, 740 ft.
Total progress to Jan. 17, 1941 was 7,305 ft.; approximately 80 per cent of length was supported with 6-in. steel H-beams on 4-ft. centers.
First 1,200 ft. of tunnel in Beotele schist; remainder in various types of granite, some tight, some blocky and loose.
Best day's run in non-supported ground, 59 ft.; best day's run in supported ground, 50 ft.

Penalty against contractor for overbreak, $15 per cubic yard. S. S. Magoffin Co., Inc. has contract for first 8,000-ft. section of tunnel. Work is two months ahead of schedule—should finish 4 to 5 months ahead of schedule—in February or March, 1941. In good rock an average cycle from shot to shot is 3½ hr. for an advance of 6 ft. A 5-ft. cycle has been made in 2½ hr. However, constant changes in rock formation, and necessity of avoiding too much overbreak penalty, pull these averages down considerably. The average progress per day to date is 31 ft.

### Drilling and Blasting

Rounds pulled, 5 ft. to 9 ft., depending on rock.
Number of drill holes per round, 36 to 40, depending on rock.
Powder consumption averaged just under 8 lb. per cubic yard.
Delay blasting caps used, 1st to 10th delay; du Pont



**DRILLING OF FULL FACE** of 9¾-ft. (finished diameter) tunnel, involving from 36 to 40 holes per round, is done from jumbo carrying four automatic feed drifters. Jumbo is 20 ft. long, weighs 20 tons and has folding platforms at each side.

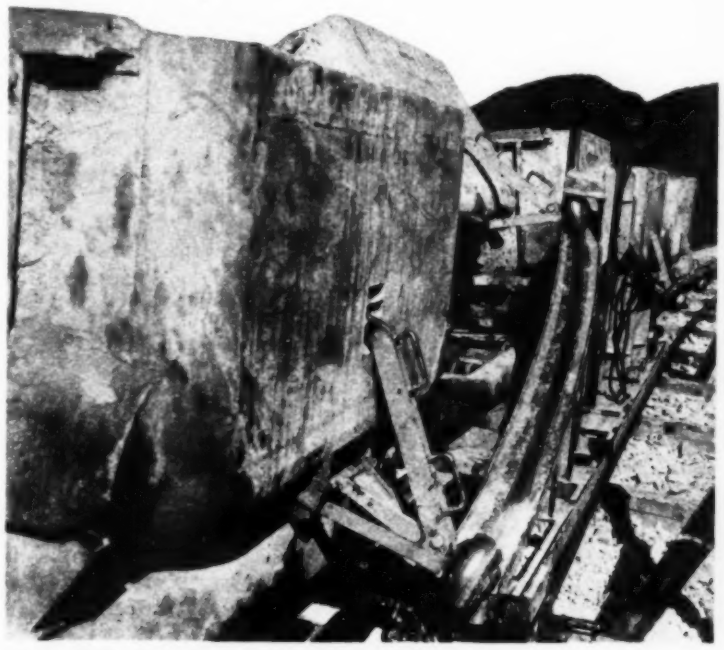
**TUNNEL MUCK** thrown down by blast is loaded into 91-cu. ft. cars by Eimco-Finlay (Model 21) loader, operated by compressed air. Bucket is crowded into muck pile to pick up load, which is then swung through vertical arc to dump into car at rear of machine.

**EXPLOSIVES (below)** are transported through tunnel to heading in inclosed car designed for safe handling of blasting material.

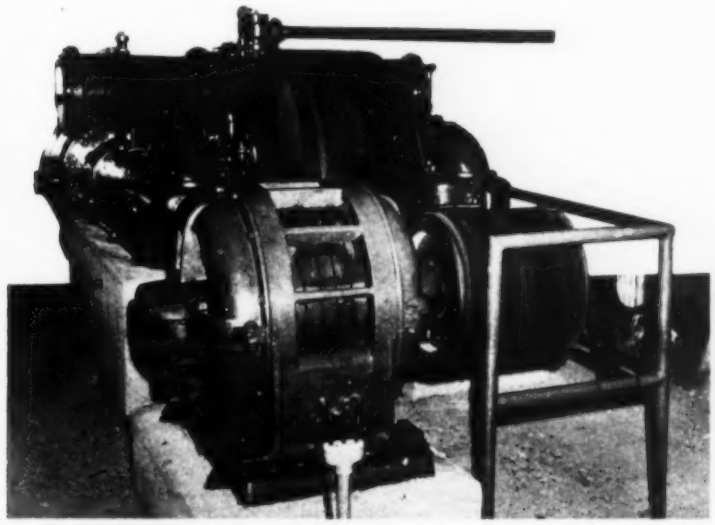
Photos, Thos. J. Barbre

**ROOF SUPPORT IS PLACED** in newly excavated portion of tunnel from upper deck of drill jumbo. Timbering consists of 6-in. steel H-beams spaced on 4-ft. centers. In foreground is carload of drill steel fitted with detachable bits.

**LOADED CARS** of 91-cu. ft. capacity are ready for hauling to dump beyond tunnel portal. With mechanical loader, in background, at tunnel face, loading time is from 2 to 2½ min. per car.

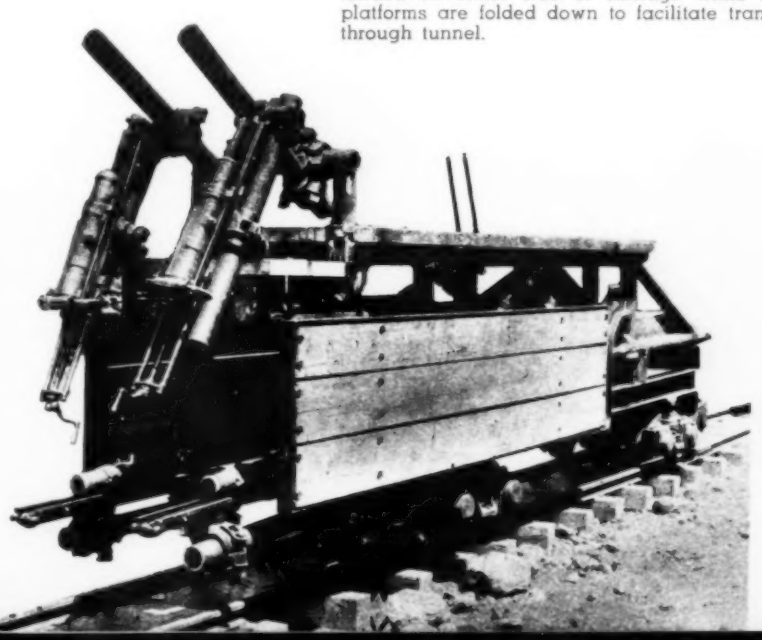


**AUTOMATIC DUMPING OF CARD TUNNEL CARS** is accomplished with aid of detachable arms which strike ramp and tilt car as train moves forward. After dumping, arms are detached and left on hand for next train load.

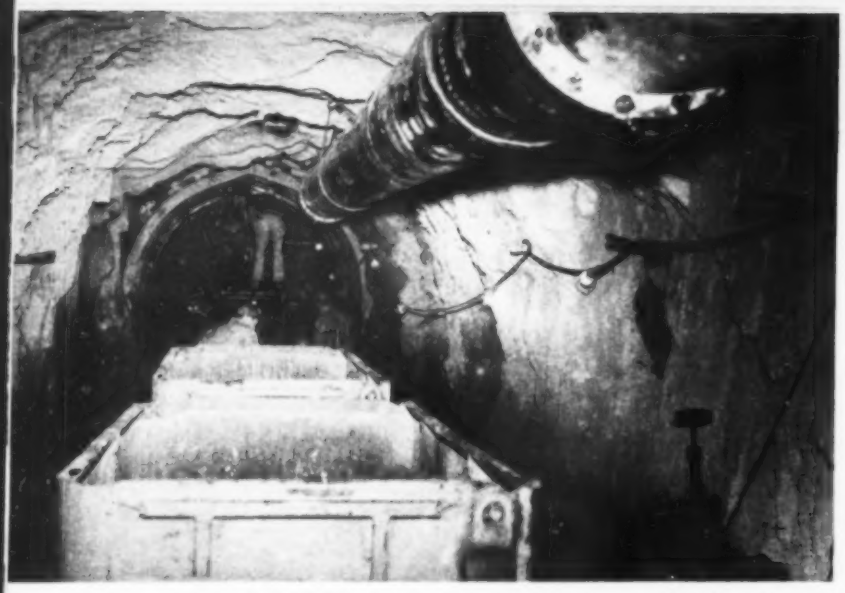


**AIR COMPRESSOR,** an Ingersoll-Rand unit driven by 200-hp. General Electric motor, supplies air for drilling and for operating muck loader at face.

**DRILL JUMBO (below and at right)** has column mountings for four automatic-feed drifters and one extra drill for test holes. At extreme left of right-hand photograph is F. R. MERRICK, tunnel superintendent. In view at right platforms are extended on either side of carriage while in view below platforms are folded down to facilitate transport of jumbo through tunnel.



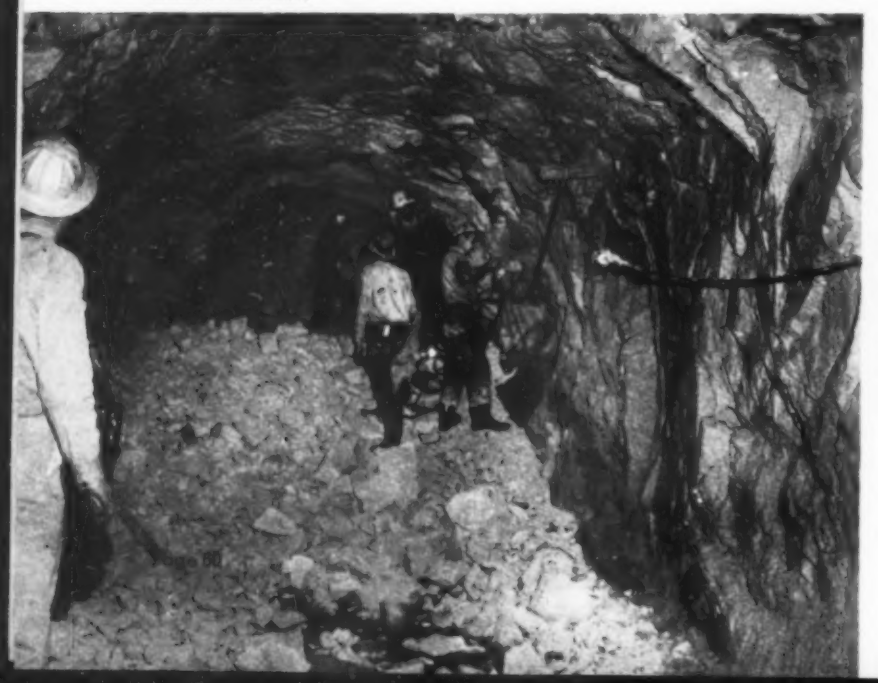
# Continental Divide Tunnel (Continued)



**TUNNEL VENTILATION** is provided by 30-ft. lengths of 20-in.-diameter Hardesty steel pipe of No. 14 gage hung from roof and supplied with air by 40-hp. Western blower.

**SHARPENING OF DETACHABLE BITS** is done on this Ingersoll-Rand hot milling machine in contractor's blacksmith shop. Starter bits are from 1⅞- to 1¾-in. gage and each milling reduces gage 1/16 in.

**MUCK PILE (below),** immediately after shooting, is ready for attack by mechanical loader. Electrician strings lights as engineers inspect face under observation by F. R. Merrick, tunnel superintendent, (at extreme left, with back to camera.)

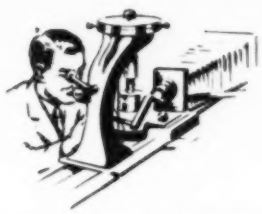


**HAULAGE OF MUCK** from tunnel face to dump is done by 3½-ton Mancha electric storage battery locomotives pulling trains of 91-cu.ft. capacity Card automatic-dumping tunnel cars.

**CALIFORNIA SWITCH** is used to transfer empty and loaded cars during mucking operations. String of loaded cars is brought back to this point, and an empty is switched on to heading end of muck train which then is returned to face for loading.

*(Continued on page 82)*

# Profit from ROEBLING Research



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Years of research have gone into the development of Roebling "Blue Center" Wire Rope.

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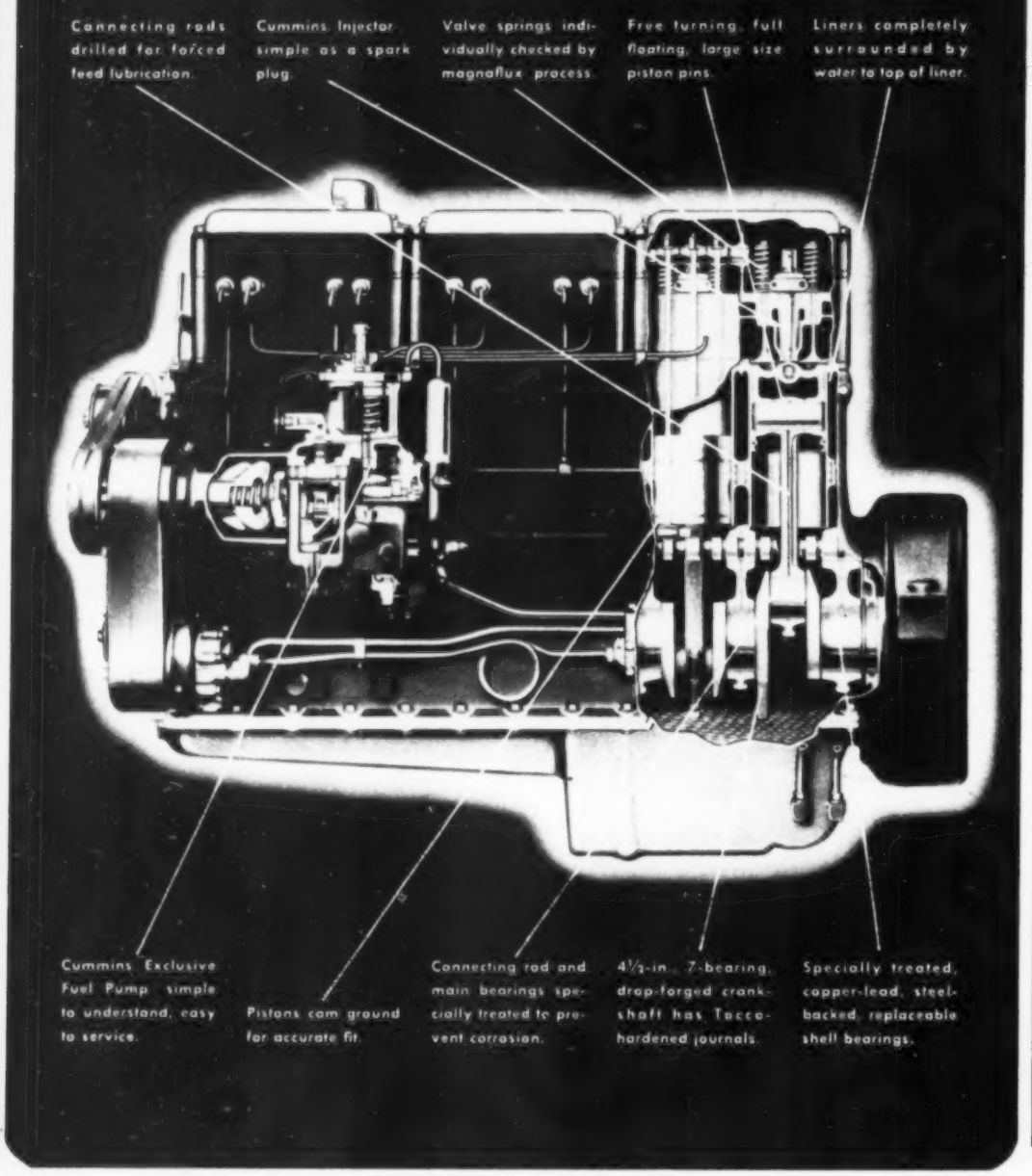
Precision—that all-important factor which so strongly influences material specifications and manufacturing methods—governs every step in the building of Cummins Dependable Diesels. This precision is bound to represent a slightly higher first cost—but a definitely lower cost in maintenance, dependability and economy over a much longer, useful life. That's why the nation's leading contractors buy Cummins Dependable Diesels again and again. They will tell you . . . their operating records will tell you . . . that precision doesn't cost—it pays! Cummins Engine Co., 1716 Wilson St., Columbus, Indiana.

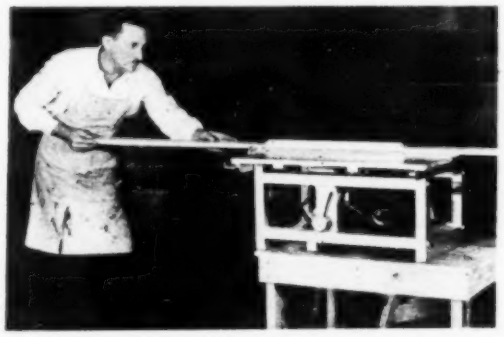
*Cutaway view of Model HB-600 Cummins Dependable Diesel. Horsepower: 150 at 1800 rpm. Displacement: 672 cu. in. 6 cylinders, 4⅛" bore and 6" stroke.*

CUMMINS Dependable DIESELS


Connecting rods drilled for forced feed lubrication.
Cummins Injector simple as a spark plug.
Valve springs individually checked by magnaflux process.
Free turning, full floating, large size piston pins.
Liners completely surrounded by water to top of liner.
Cummins Exclusive Fuel Pump simple to understand, easy to service.
Pistons cam ground for accurate fit.
Connecting rod and main bearings specially treated to prevent corrosion.
4½-in. 7-bearing, drop-forged crankshaft has Tocco-hardened journals.
Specially treated, copper-lead, steel-backed, replaceable shell bearings.


# CONSTRUCTION EQUIPMENT NEWS

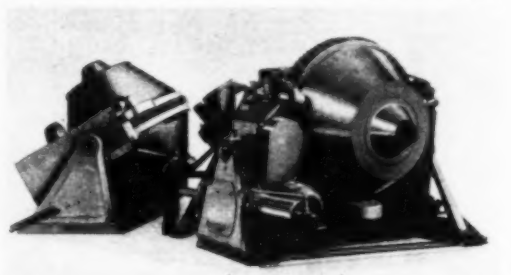
**POWER SAW FOR MAINTENANCE WORK** and smaller building operations, called Buildsaw, is designed for easy portability around job and can be used where larger machines would be impractical. Top and frame are built of durable steel-tied wood construction, light enough for loading into back or trunk of automobile or on truck. Powered by 110-v.



motors from ½ to 1 hp., machine will rip, cut off, mitre, groove and dado. Equipped with 10-in. saw blade which cuts to 3-in. depth. To facilitate angle or bevel ripping, special tilting fence is available. Features include: SKF ball-bearing arbor, 8- or 10-in. Atkins saw blade, V-belt drive, steel mitre gage and ripping fence with milled steel tracks. Saw guard is counterbalanced by spring. Rigid screw-type assembly raises and lowers saw arbor. Top, 24x30 in., accommodates standard-size building lumber. Weight, 100 lb.—**Paxson Co., Dowagiac, Mich.**

★ ★ ★

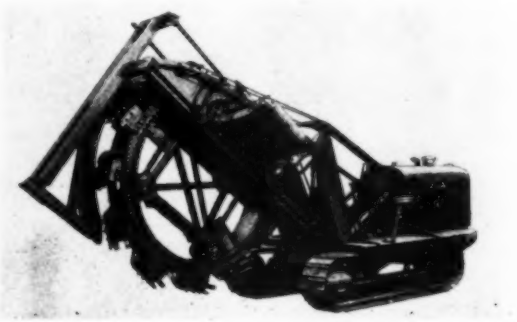
**IMPROVED TILTING MIXER** may be equipped for either front or rear end charging to accommodate particular plant set-up. Feed chute automatically swings out of way while drum is being tilted. Drum



ring gear and pinion, both with machine cut teeth are made of high carbon steel. Other new features: all-welded steel tilting frame; machine cut reduction gears running in oil; multiple V-belt drive; anti-friction bearings throughout; adjustable guide rollers with tapered face. Three of these machines, each of 4-cu.yd. capacity, were purchased recently for use on TVA Cherokee dam project on Holston River in Tennessee.—**T. L. Smith Co., Milwaukee, Wis.**

★ ★ ★

**ROTARY WHEEL TRENCHER,** for use in digging pipe line trenches for gasoline, gas, sewer, water and other utility requirements, features an excavator wheel of "trussed bridge" construction said to provide greater strength and resistance to distortion than other frames of equal weight. Convey-



## New Koehring Trail-Dump Has More Capacity

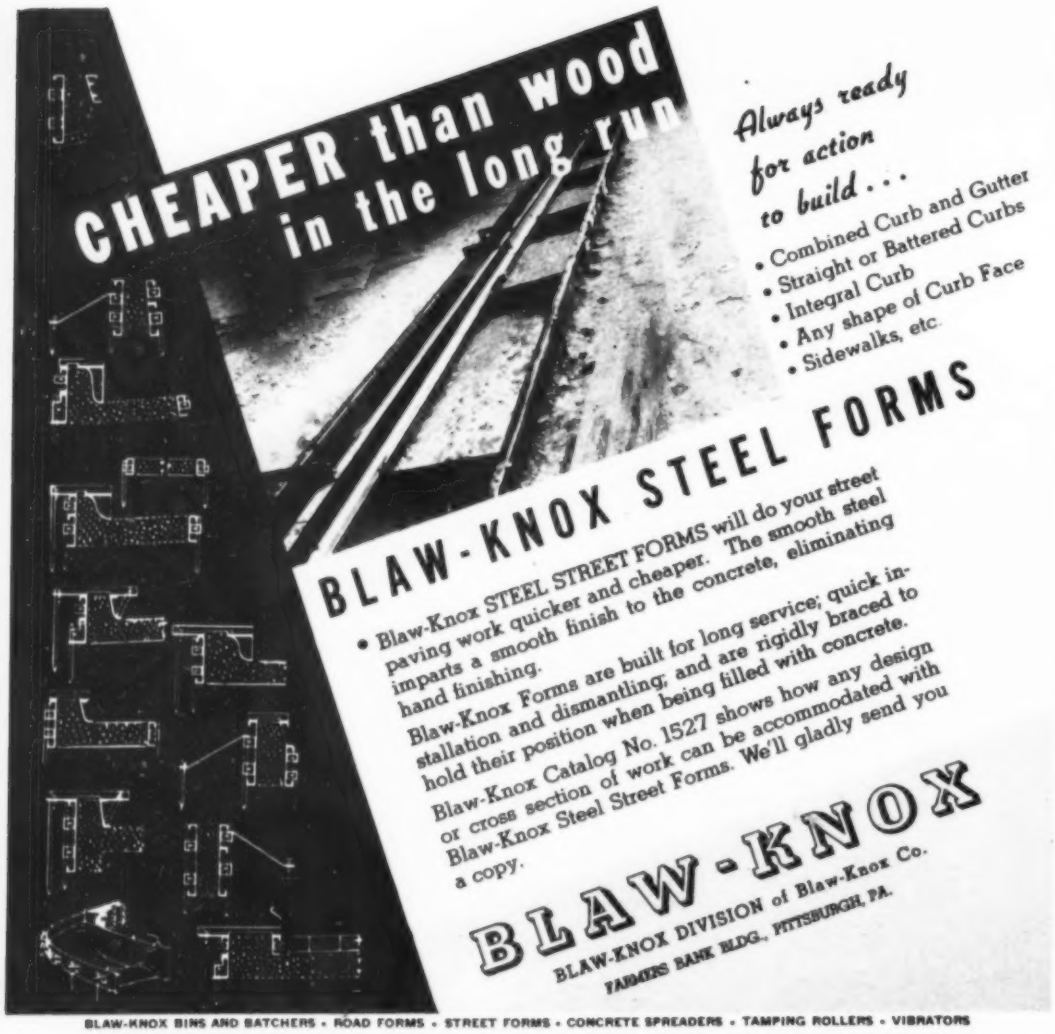
Another size . . . 12 cubic yards . . . has been added to the popular group of Trail-Dump units. This new unit has all the improved operating advantages of other proven models. High travel speed, short turning radius, easy maneuverability, instantaneous dump, ample power per gross ton and flotation . . . all combined . . . produce *more* yardage in the fill. Speed and economy, steady operation, flexibility of application and safety traveling are Koehring advantages . . . tested, proven and *profitable for you.* Know these advantages and many others . . . learn how they make money for you . . . see the Trail-Dump on the job.

**KOEHRING COMPANY, *Milwaukee, Wis.***

● Koehring 12-yard Trail-Dump hauled by Koehring pneumatic tired tractor, with "non-raring" hitch, powered by General Motors 2-cycle Diesel . . . or gasoline engine . . . body interchangeable with Wheeler body for two tools with one tractor.

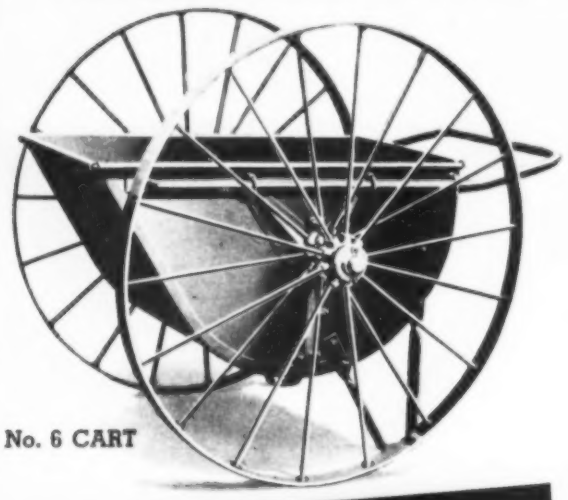
KOEHRING HEAVY DUTY

**HEAVY-DUTY CONSTRUCTION EQUIPMENT**


CHEAPER than wood in the long run
Always ready for action to build . . .
• Combined Curb and Gutter
• Straight or Battered Curbs
• Integral Curb
• Any shape of Curb Face
• Sidewalks, etc.
BLAW-KNOX STEEL FORMS
• Blaw-Knox STEEL STREET FORMS will do your street paving work quicker and cheaper. The smooth steel imparts a smooth finish to the concrete, eliminating hand finishing.
Blaw-Knox Forms are built for long service; quick installation and dismantling; and are rigidly braced to hold their position when being filled with concrete.
Blaw-Knox Catalog No. 1527 shows how any design or cross section of work can be accommodated with Blaw-Knox Steel Street Forms. We'll gladly send you a copy.
BLAW-KNOX
BLAW-KNOX DIVISION of Blaw-Knox Co.
FARMERS BANK BLDG., PITTSBURGH, PA.

BLAW-KNOX BINS AND BATCHERS • ROAD FORMS • STREET FORMS • CONCRETE SPREADERS • TAMPING ROLLERS • VIBRATORS
CONCRETE BUCKETS • CLAMSHELL BUCKETS • TRUCK MIXERS • STRIPING MACHINES • TURNTABLES • ROAD FINISHERS • STEEL FORMS

# THE CART THAT CAN TAKE IT



No. 6 CART

**FOR HEAVY DUTY**

12 gauge tray all welded.

½" dia. continuous butt-welded rod at top of tray.

Malleable brackets extending full depth of tray.

42" diameter wheels—flat or oval tire.

Plain or roller bearings.

Can be equipped with 44" diameter pneumatic tire wheels.

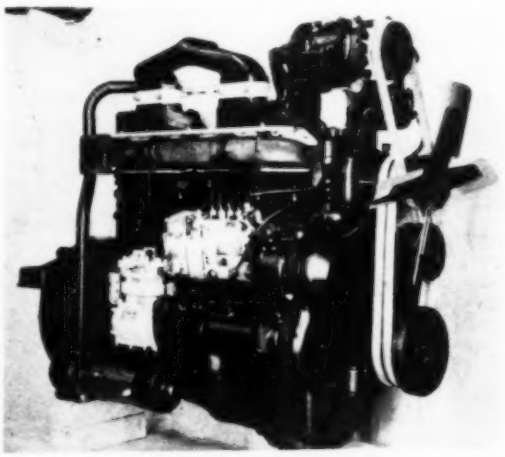
Other carts having 30" or 36" diameter steel wheels, and 30" diameter pneumatic tire wheels.

**STERLING**
WHEELBARROW CO.
7100 W. WALKER ST.
MILWAUKEE, WIS.


or belt has new type of belt guide clips said to insure even tracking of belt and at same time to minimize belt and pulley wear. Constant-center-type final drive claimed to eliminate need for idlers to take up chain slack and to provide smooth flow of power at any digging depth of excavator wheel. Cuts trench up to 26 in. wide and up to 5 ft. 6 in. deep. Overall width, exclusive of spoil conveyor, 6 ft. 8 in. Overall digging height 8 ft., 1¼ in. Wide range of cutting feeds, conveyor belt and travel speeds provided for all types of work.—**Buckeye Traction Ditcher Co., Findlay, Ohio.**

★ ★ ★

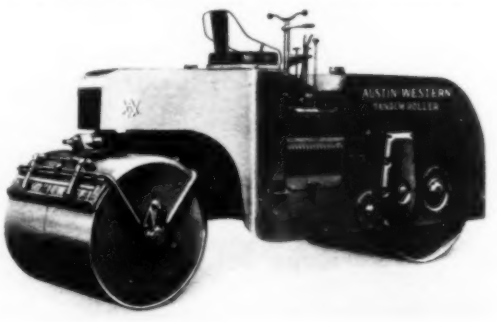
**SMALLER DIESEL ENGINE** added to Mack-Lanova line is designed for installation in four-wheel truck models of 24,000-26,000 lb. gross vehicle weight range. Unit has piston displacement of 405 cu.in., bore and stroke of 4x5⅜ in., operates at maximum governed speed of 2,200 r.p.m. and develops 107 hp. Maximum torque at 1,200 r.p.m. is 308 lb./ft. Employs Lanova system of controlled combustion and is said to develop high power and economy while operating



at moderate compression and fuel injection pressure. Cylinders and crankcase cast in block with removable dry cylinder sleeves. Overhead valves are operated by pushrods and rockerarms and double concentric valve springs. Injection equipment consists of flange-mounted Bosch multiple-unit injection pump with an integral governor on one end and pintle-type nozzles. Seven main precision thin-shell type bearings with copper lead lining support 147-lb. pack-carburized and case-hardened crankshaft. All lubrication passages are rifle drilled out of solid iron, no tubes or piping being used. All timing and accessory drive is through train of helical gears with exception of water pump, fan and generator which are driven by conventional triangular double V-belt. Cold-circulation thermostatic system of temperature control is used in connection with thermostat and directed water flow.—**Mack Trucks, Inc., 34th St. & 48th Ave., Long Island City, N. Y.**

★ ★ ★

**TANDEM ROLLERS,** 5- to 10½-ton models, for general use in precision work, have been objects of various improvements and refinements in order to assure users of exceptionally smooth and steady performance. Weights of front and rear roller may be increased, if desired, from 133 to 301 lb. per lineal inch by adding water. Other advantages: better visibility closer to curbs; more convenient controls, with reverse clutch lever mounted on steering column for easier and less tiring clutch engagement; effortless hydraulic steer; lower center of gravity to prevent sway; less frame overhang for rolling closer to curbs; more ground clearance under side plates to clear higher curbs; more stability because box-shape construction resists twisting strains; balance of engine and final drive parts provide uniform weight distribution across entire rear roll and good



# "GULF PERIODIC CONSULTATION SERVICE has helped us get ahead of contract schedule"

*. . . says this Delaware Aqueduct Contractor**

* Dravo Corporation of Pittsburgh is driving 10.4 miles of tunnel for the Delaware Aqueduct from two shafts, mainly in Highlands gneisses and granites. At the right is shown the head frame of one of the shafts. Above is shown the mucking operation in one of the headings.

## *"By following the Gulf Engineer's Recommendations we get Peak Efficiency from our Equipment"*

"RACING against time on this job, efficient performance from all our equipment is a *must*," says this Delaware Aqueduct contractor. "We feel sure our fine record thus far is due in large part to the effectiveness of our lubrication."

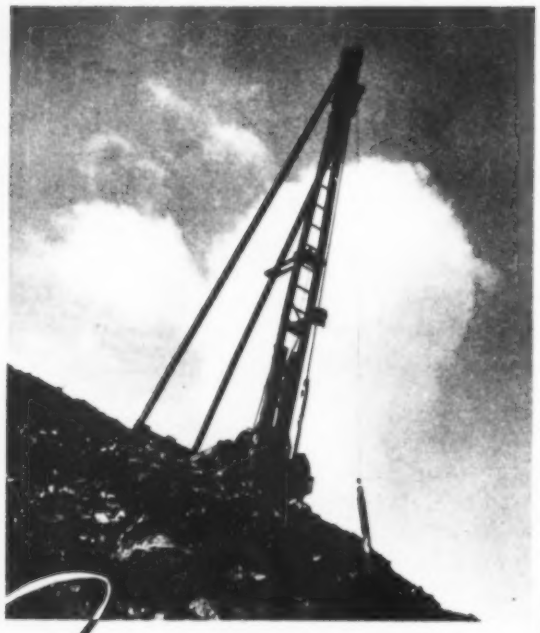
The Delaware Aqueduct is a construction project of the first magnitude. Deep in the bed rock of New York State is being bored a 117-mile tunnel to replenish New York City's present overtaxed water system. When completed, this new system will add 540 million gallons per day to the present supply.

This job is urgent. Contractors are maintaining extra heavy work schedules—equipment is being pushed to new limits. But leading contractors taking advantage of Gulf Periodic Consultation Service and Gulf quality lubricants are ahead of contract schedules!

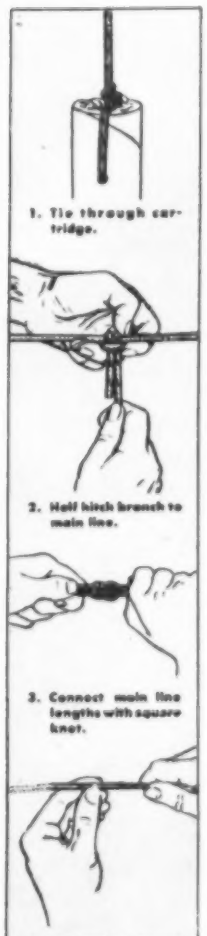
Are you seeking a means of speeding up work and cutting operating costs? Gulf quality lubricants and fuels are quickly available to you through more than 1100 warehouses in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.

GULF INDUSTRIAL LUBRICATION

**GULF OIL CORP.**
**GULF REFINING CO.**
*General Offices: Pittsburgh, Pa.*



*For well drill holes*


1. Tie through cartridge.
2. Half hitch branch to main line.
3. Connect main line lengths with square knot.
4. Fuse and cap on end of main line.
IMPORTANT
Branch lines should lead away from main lines at right angles. Avoid kinks and small loops.

Primacord will save you money. It consists of a core of PETN* enclosed in a flexible, waterproof textile covering. Because it detonates each cartridge in the drill hole, you get *more work* from your explosives, for each cartridge has the added force of a primer cartridge. And because it is used to connect all holes, you can plan the firing rotation to relieve burden, and get *better work* from your blast. Thus you save time, labor, money; and also reduce hazard. Send for the Primacord Book.

*PENTAERYTHRITETETRANITRATE

**PRIMACORD BICKFORD**
**Detonating Fuse**

PR29

**The ENSIGN-BICKFORD CO.**
**SIMSBURY, CONN.**

*Makers of Cordeau-Bickford Detonating Fuse—and Safety Fuse since 1836*


accessibility for reaching and servicing moving parts, hydraulic pump and strainer. Mechanical features include All-welded, two-piece front and rear rolls, mounted on anti-friction bearings; front fork with horizontal king pin mounted on widely spaced bearings and large-diameter, vertical king post mounted in Timken bearings; gasoline or diesel power; two speed forward and two speed reverse type transmission with heat-treated, alloy steel gears and shafts and anti-friction bearings throughout; master clutch between engine and transmission controlled by foot pedal and two double-disk reversing clutches.—**Austin-Western Road Machinery Co., Aurora, Ill.**

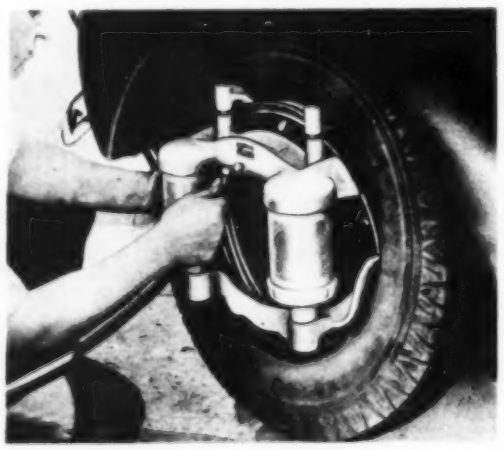
★ ★ ★

**TRUCK BUCKET LOADER,** called "Trukbukit," is complete machine for handling buckets—picks them up from ground level or below grade, carries load in front of rear axle or behind on truck. Sets down loaded bucket or dumps load and spreads it. Used for moving and planting trees, handling castings, taking up old curbing, excavating ditch, laying pipe, pulling piling, backfilling ditch and handling oil drums. Feature: Able to reach as low as 30 ft. below ground line of truck to pick up load. Truk-

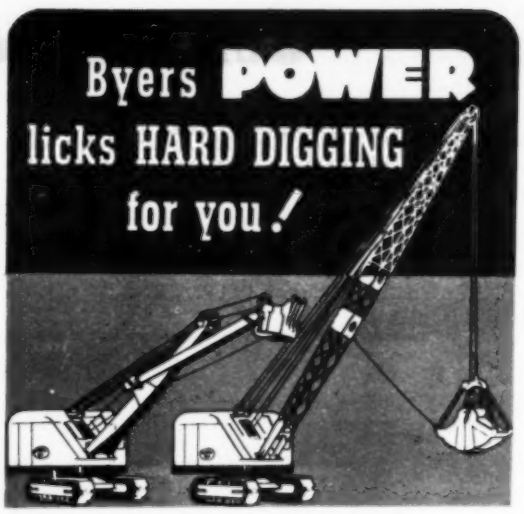
bukit has long reach which permits it to lift full buckets, large pipe, stones or other pieces in back of truck and still keep strain well ahead of rear axle. When traveling, hook holds bucket firmly in place preventing load from shifting. Carries load high permitting high and clean dumping. Hoisting unit: mechanical type with power take-off truck; two disk-type clutches to control raising and lowering of boom; controls all in truck cab. 7/16-in. 6/19, improved plow steel cables; 6¾-in. pitch diameter sheave with Oilite bearings; standard cable length permits working depth 12 ft. below grade; automatic release on hoisting clutch. Buckets: one-piece, tilt-type, all welded and watertight; tapered design permits nesting by removing legs; sizes 2 cu.yd.; 5/16-in. plate; 39 in. high; 1,100 lb. 1½ cu.yd.; ¼-in. plate; 30 in. high; 750 lb. Transport body: carries 12 men; hard wood and steel reinforcing; weight 300 lb.—**Pioneer Engineering Works, Minneapolis, Minn.**

★ ★ ★

**PORTABLE TIRE MOUNTER,** it is claimed, will mount in three operations and in 10 sec. any tire on 15- or 16-in. drop center rims, eliminating use of injurious mounting tools, such as hammers and tire irons and extending tire life. Operated by compressed air. When air pressure is applied, patented



shoe automatically flips tire bead over rim, said to prevent such accidents as pinched tubes, scuffed white side walls and strained cords or beads. Fits ordinary air chuck used for tire inflation. Of particular value in service stations, tire repair shops and to fleet operators.—**Alemite Division, Stewart-Warner Corp., 333 N. Michigan Ave., Chicago, Ill.**


● It's power at the business end of a shovel that you need . . . cutting power that brings up a full dipper every time.

In any Byers, "direct drive" delivers *maximum* power direct to hoist, crowd and swing and to travel in and out where the going's tough.

This is another reason why you should investigate Byers ⅜ to ¾ yd. shovels.

**11 FULLY CONVERTIBLE MODELS IN 3/8-1/2-5/8-3/4 YD. SIZES**

**Modern CRANES and SHOVELS**

**BYERS**
RAVENNA, OHIO

*Where Going is* **TOUGH**

**WARCO J & S TRACTION TREADS WILL PLOW THROUGH**

In ice, snow, sand, loose ground or mud, your trucks will come through with a pay load if equipped with J & S Traction Treads.

●

Shoes bridge space between dual tires, forming a large bearing area in contact with ground, producing positive traction, limited only by the power of your engine.

**W. A. RIDDELL CORPORATION**
**BUCYRUS, OHIO**

# *More yardage each hour*

## *when you use Bethlehem road steel*

Whether it's a small contract or a large job like the new Pennsylvania Turnpike, you'll find that using Bethlehem Road Steel enables you to finish more yardage per hour.

Bethlehem road steel materials are specifically designed to save your time and increase your profits. Bethlehem Road Joints, for instance, are one-piece units, easily installed by one or two men working ahead of the pouring crew. Bethlehem Bar Mats and Reinforcing Bars are delivered to you promptly, cut to the dimensions needed on your job. Bethlehem Highway Guard, Cable Brackets and Steel Posts are easy and economical to drive and string.

You'll find, too, that it saves you time and money when you make Bethlehem your headquarters for road steel. A single order placed with Bethlehem eliminates unnecessary bookkeeping, telephoning and correspondence.

For higher profits and more yardage completed each hour on your next contract, get Bethlehem Road Steel Service to supply you with all the road steel materials you need.

**BETHLEHEM STEEL COMPANY**

BETHLEHEM STEEL

# SPEED & ACCURACY!!!

## COVER 1,000 SQ. FT. IN 15 MINUTES!!

### with "Whiteman" Cement Floor Finisher

*Whiteman "Precision" Cement Floor Finisher comes equipped with gasoline or electric drive, complete operating control with finger snap switch, V-Belt drive, and adjustable rotating trowels.*

**UNEQUALLED FOR HARDNER & COLOR WORK**

## GASOLINE or ELECTRIC DRIVE

***Faster . . .***

Your cement finishers can cover twice the area with the "Precision" Cement Floor Finisher — which will travel over 1,000 sq. ft. in as little as 15 minutes. The rotating, adjustable pitch trowels glide over the surface under absolute control of the operator — produce flatter, smoother floors in half the time. "Precision" is the *only* machine that completely FLOATS and STEEL TROWELS a cement floor.

***More Perfect Floors . . .***

You will get a far denser, more wear-resistant floor without laitance or voids caused by water or air particles. You can use a low water ratio, for the weight of the machine will compact your aggregate, bringing what little water you have to the surface. The coarse aggregate will be uniformly distributed throughout the entire finish and right up to the wearing surface. You get an absolutely level floor without high or low spots or riffles, due to the action of the rotating steel trowels.

***Pays For Itself . . .***

You finish cement with "Precision" at substantially reduced cost, for this machine finisher eliminates unnecessary costly overtime. It is real insurance against your floor "getting away from you" when extra finishers are not available.

***Now in General Use . . .***

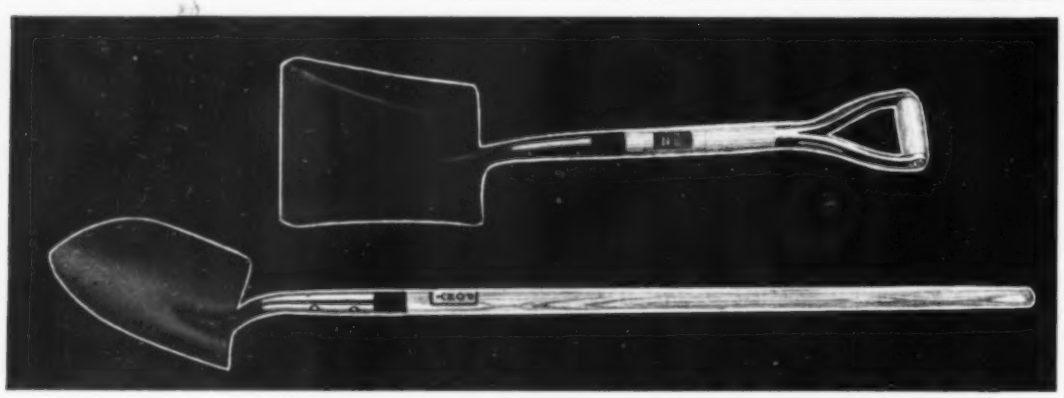
The "Precision" Cement Floor Finisher has given successful performance everywhere, being used on work for the Boeing Aircraft Co., Douglas Aircraft Co., Lockheed Corporation, and greater portion of army and navy jobs.

***Write TODAY for the name of your nearest dealer.***

## WHITEMAN MANUFACTURING CO.

3249 CASITAS AVE. LOS ANGELES, CALIFORNIA





# SOLID SHANK SHOVELS

## *All Grades Now Heat Treated*

Every Solid Shank Shovel made by "Ames" is now heat treated. Whatever the grade or brand, this heat treatment adds to the toughness of these famous shovels which are made from one bar of steel.

***BRANDS***

HUSKY
BRONCO
PONY
COLT

AMES Since 1774

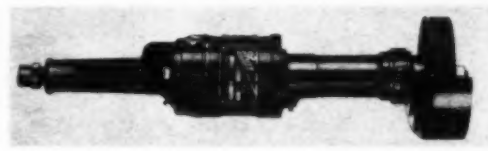
**"AMES" PRODUCTS**

SHOVELS...SPADES...SCOOPS
FORKS...HOES...RAKES
POST HOLE DIGGERS
AGRICULTURAL HANDLES

## AMES BALDWIN WYOMING CO.

PARKERSBURG, W. VA. • NORTH EASTON, MASS.

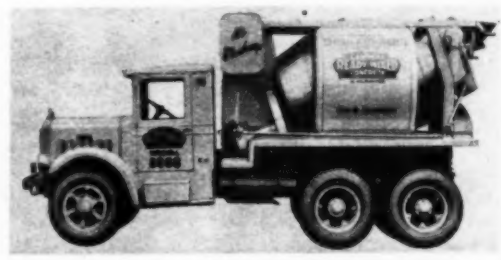

**PORTABLE AIR GRINDER** is built on "Air Behind the Blades" principle said to keep rotor blades out against cylinder wall preventing any "dead center" position or depression of blades in slots



due to oil accumulation and resulting in positive starting under all operating conditions. This grinder is one of complete Thor line of 50 models and sizes for all types of grinding from snagging rough castings to finished precision dies. Sizes range in weight from 18 oz. to 24 lb.; in length from 5½ to 39 in.; in speed from 3,000 to 21,000 r.p.m., and in capacity from 1½- to 8-in.-diameter wheels. — **Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago.**

★ ★ ★

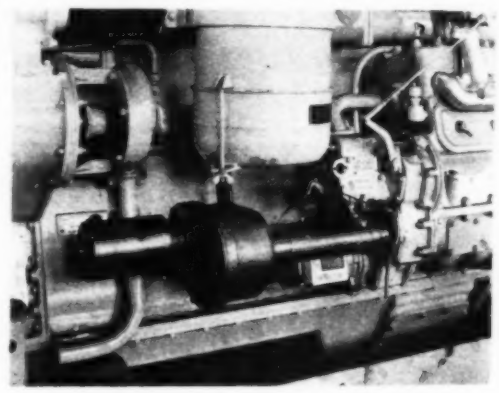
**NEW LINE OF CONCRETE MIXERS AND AGITATORS,** called Rex "Hi-Discharge", in 2-, 3-, 4- and 5-yd. sizes, has as primary features, rear charging, a new mixing principle and a high discharging point for greater spouting range. Drum has one opening used both for charging and discharging with no charging door to be adjusted. Rear charging hopper has triple function—serves as receiving hopper for aggregates while charging, as station-



ary throw-back blade while mixing and affords visibility for sampling of batch. "Hi-Discharge" said to be able to place concrete over 20- to 22-ft. areas on all types of jobs; to discharge low slump mixtures as fast as other types; to give added inches of discharge height for pouring concrete directly from street into sidewalks and curbs. "Hi-Discharge" utilizes Rex Quint-spout which has five chuting lengths and zipper spout expansion. Mixing action scours all parts of drum making it self-cleaning and assuring faster and better mix. Other features: Completely inclosed anti-freeze water system; improved chain belt drive and twin clutch transmission; hatch with removable door for drum inspection. —**Chain Belt Co., Milwaukee, Wis.**

★ ★ ★

**NEW ELECTRIC STARTING DEVICE.** for small 2-cylinder engines on Caterpillar diesel units, consists of conventional automotive type starter fitted with Bendix gear which drives spur gear. An extension shaft attached to spur gear engages main crankshaft of small gasoline engine, thus starting it.



Entire gear unit inclosed in cast-iron housing. Provision made for lubrication of shaft bearings. Hand and magnetic switch also furnished with assembly. Either 6- or 12-v. starting motor may be had, depending upon generator and battery equipment available on diesel engine. Said to save its costs in one month by elimination of lost operating time. Starter may be employed in operation of diesel cranes, shovels, bulldozers and other similar equipment.—**H. K. Porter Co., 4923 Harrison St., Pittsburgh.**

# 1500 EXCAVATORS PROVE PLENTY

## ...about this New Design!

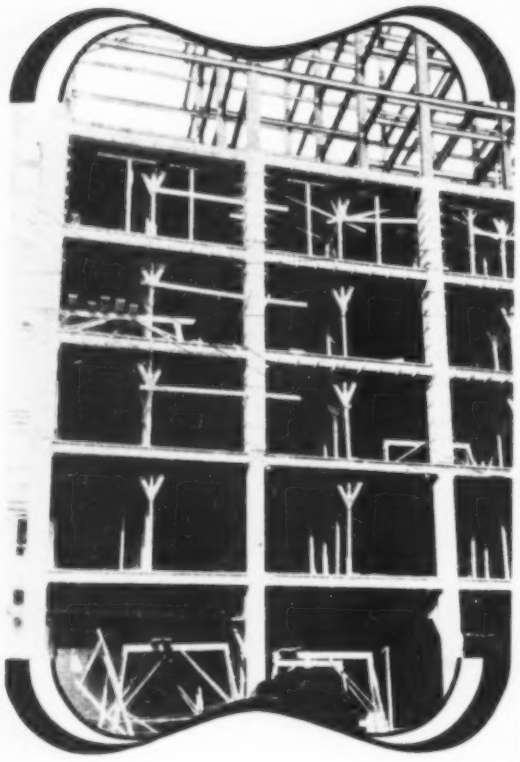
1500 Rolled Alloy Steel EXCAVATORS HAVE CONCLUSIVELY PROVED THAT P&H'S MODERN DESIGN IS FAR AHEAD -Superior

P&H's modern design of rolled alloy steels was introduced 1500 excavators ago! . . . *fifteen hundred* machines that have been handling everything from soft loam to cemented gravel and rock. Is it any wonder that the trend of profit-wise contractors is toward P&H?

*General Offices:* 4494 W. National Avenue, Milwaukee, Wis.

**HARNISCHFEGER CORPORATION**

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS



FOUR FLOORS OF SHORES LEFT IN PLACE, NO RESHORING, PROVIDES ADDED SAFETY.

## *Speed with Safety*

**when**

# HAUSMAN

## SETS YOUR FORMS

On jobs where concrete work is an important item you can relieve yourself of time and worry and at the same time effect a saving if you have Hausman set your forms.

Hausman maintains a well trained, skilled force for form setting and will work closely with your men to keep the job moving . . . no delays in pouring concrete . . . complete cooperation from start to finish.

There's savings ahead for the contractor who calls on Hausman to handle his form setting. Let us show you how and where Hausman can save on your next bid.

HAUSMAN

**FORMS FOR OTHER PURPOSES:** Hausman also builds ribbed slab forms, removable steel forms for all types of construction where steel forms are economical and adjustable round column molds for multi-story buildings.

The HAUSMAN STEEL Company

TOLEDO · · OHIO

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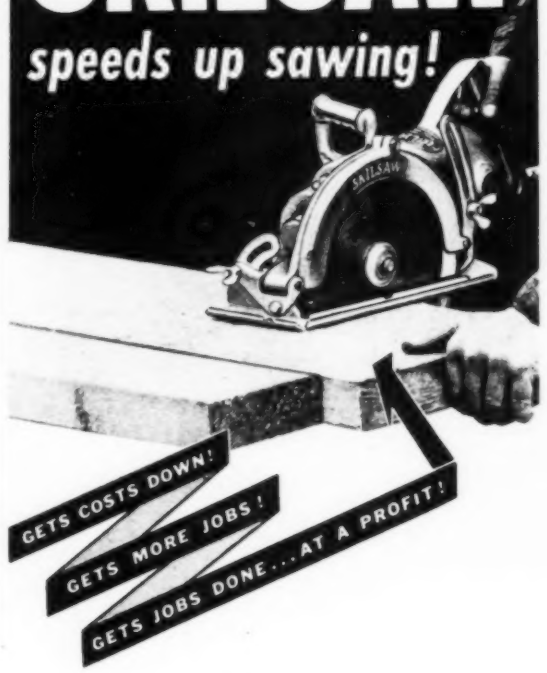
# When skilled hands are scarce...

# SKILSAW

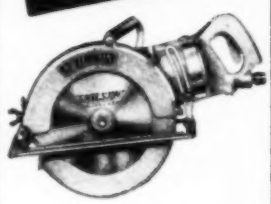
## *speeds up sawing!*




**WHEN man-power shortage slows down construction, use SKILSAW's *faster* cutting power to speed up *every* sawing operation . . . to *keep costs down* so you can turn more *bids into jobs*, and more *jobs into profit!* Increasing demand for skilled carpenters makes SKILSAW's time and cost-cutting features more necessary than ever . . . that's why more SKILSAWS are bought today by progressive builders than ever before in our history.**

**And make no mistake, there's no other electric saw like it! SKILSAW out-performs all others. It is lighter, easier to use. It saws faster and deeper . . . it *saves* on every cut you make. 9 POWERFUL SIZES for wood, metal, stone and compositions.**

**Pneumatic SKILSAW**



**New! The most famous portable circular saw now available for operation by air. Rips and cross-cuts timbers up to 4 in. full; bevel-cuts lumber 3-5/16 in. thick at 45°. Ideal for cutting terra-cotta.**

- **Special governor regulates speed, reduces air consumption.**
- **Poppet-type throttle valve is leak-proof; cuts off air instantly.**
- **Safety lock on throttle prevents accidental starting.**
- **12 in. blade; free speed 1200 R.P.M.**

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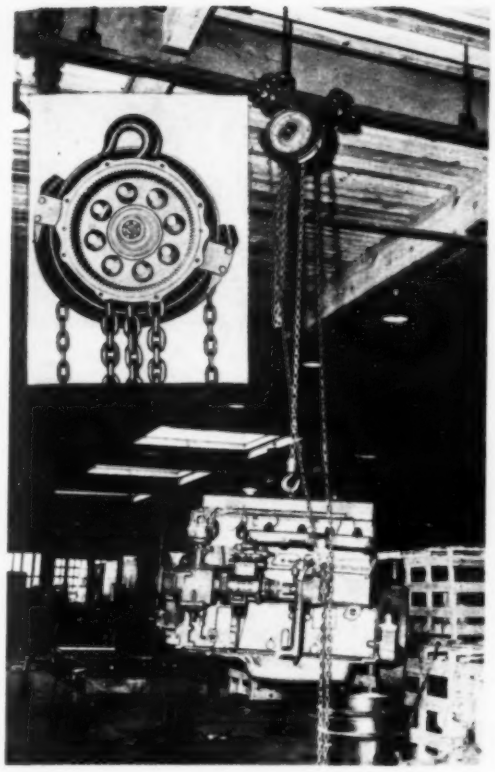
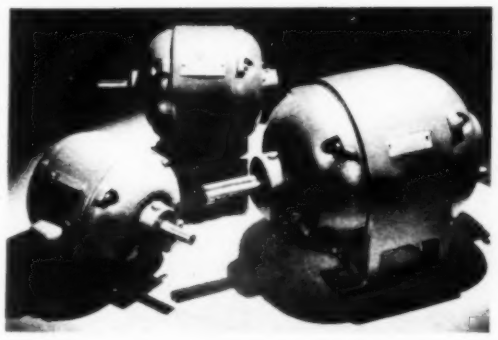


**CAM-ACTUATED TWO-GEAR CHAIN HOIST** for use in industrial plants where speed, ease of operation and durability are essential, has capacity from ½ to 3 tons, depending upon model. Hoisting speeds range from 9, 18 and 26 f.p.m. for full, half and quarter loads raised by ½-ton unit to 2, 4, and 5 f.p.m. for full, half and quarter loads raised by 3-ton model. All working parts fully inclosed in malleable iron housing. Gear system is sealed and runs in oil, assuring elimination of practically all friction. Equipped throughout with lubri-sealed ball bearings. Specially designed load hooks. Alloy steel electric welded chain.—**Coffing Hoist Co., Danville, Ill.**

★ ★ ★

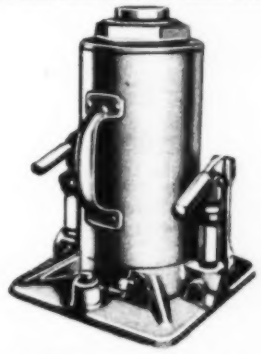
**MAJOR ADVANCES IN MOTOR DESIGN,** characterized as most extensive product changes in history of General Electric Co., are embodied in a completely new line of polyphase induction motors named Tri-Clad and manufactured in integral horsepower sizes. Outstanding improvements include better insulation of current-carrying parts, more complete protection through use of cast-iron frame of box type, modern streamlining with minimum of recesses or projections, improved bearing design and lubricating arrangements. Openings for cooling air in frame and end shields of motors are protected



against entrance of liquids or solid particles without interfering with ventilation. Improved air deflectors and fan design, in addition to double-end ventilation, contribute to lower motor temperatures. Tough, space-saving motor insulation, highly resistant to heat, moisture and mechanical abuse, is insured by use of new magnet wire, Formex, product of 10 years of G. E. research. In new sleeve bearings, length of bearing is properly proportioned to diameter to correct effect of shaft deflections under load; this leads to use of shorter bearings for given diameter than have been used in past. Spiral type grooving maintains oil film over all parts of new sleeve bearing under heavy loads. Bearing is locked in dust-tight, oil-tight inclosure by removable pin. — **General Electric Co., Schenectady, N. Y.**

# 140-Foot OIL DERRICK *moved with* BLACKHAWK HYDRAULIC JACKS

Blackhawk Hydraulics helped A. D. Moodie, Long Beach, California move this derrick in Huntington Beach oil field. Photo at right shows how derrick was lifted from its foundation by two FA-14 Blackhawks at each corner.

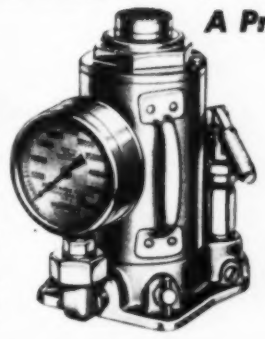


## MODEL FA-14

30 Ton. Built to take-it on toughest construction jobs. Can operate horizontally—a great advantage in close quarters. Has both speed and power pump. Weighs only 91 lbs. — hydraulic lift 9¼", total height 23¼" — one man operation — $76.00. (East U. S.)

## Blackhawk Jacks Can Be GAUGE EQUIPPED

Making the most economical and practical, portable field testing equipment available. Example: EA-11 20 ton Jack, with 4½" gauge, only $57.00. (East of Rockies) $35.00 without gauge.



## More Power and Utility Per Dollar on Construction Work

*Here's why —*

**EFFICIENT** — 94% operating efficiency as against only 12% to 30% for mechanical screw types. Example: One man, exerting 69 lbs. on end of 20" handle, raises 30-ton Blackhawk at full load. Typical screw-type mechanical jack would take several men at end of "pole-type" handle to get same action.

**COMPACT** — Note in illustration above how 30-ton Blackhawk Hydraulic Jack operates in restricted quarters because of compactness and short handle.

**PORTABLE** — One man can carry to job, position and operate. Example: 50-ton GA-11 Heavi-Lift weighs only 120 lbs.

**SAFETY** — Banish danger of sudden dropping of load due to sheared tooth on "mechanical."

**DEPENDABILITY** — Rugged, powerful, stand gaff of heaviest lifting with full rated performance.

**LOW COST** — Superior in every respect, compare favorably in price with "mechanicals" — earn greater profits for you by saving time and man-power.

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*45 Models 1 to 75 TONS*

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Laughlin drop forged Safety Clips treat wire rope right. No bending — crimping — or fraying the strands. After removing Laughlin Safety Clips, the rope is straight, unbowed, ready for use again — saving wire rope.

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**FEWER CLIPS NEEDED.** Laughlin Safety Clips are so efficient that three of them give you the same strength as four ordinary U-Bolt Clips.

Use Laughlin Safety Clips and save money.

**THIS TEST DESCRIBED IN NEW BOOKLET.** Tests made by a famous engineering school prove conclusively that Laughlin Safety Clips delivered better than 95% of rope efficiency.

Write for the free booklet that describes these tests — and also the other money and time-saving advantages you get with the modern "fist-grip" clip. Use the coupon below

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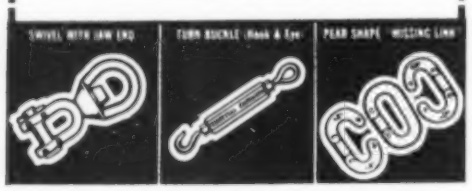


**VACUUM CUP HOLDER,** or lifter, is device said to be capable of holding as much weight as strong man can lift. Serves as handle in carrying or moving all kinds of glass as well as marble, granite and other smooth-surfaced materials whose weight normally makes lifting, pushing, raising

lowering or carrying awkward and difficult. Said also to be highly effective in handling wallboard and numerous other materials on which strong vacuum can get grip. "Red Devil" vacuum holders are offered in three models, with 4-, 6- and 7-in. disks, with chromium finished body and 5/16-in. thick base of tough, durable rubber. Swivel handle with rubber grip promotes easy handling in any position.—**Landon P. Smith, Inc., Irvington, N. J.**

★ ★ ★

**BUILD-UP WELDING ROD** is described by its producers as low cost manganese-molybdenum steel welding rod for building up worn high manganese, carbon steel or grey iron castings. Available in 18-in. lengths in bare form for straight d.c. welding and in combination coated form for both d.c. and a.c. applications. Amsco Mo-Mang rod is recommended for straight build-up welding to compensate for wear on bucket lips, crusher hammer, jaws and other parts.— **American Manganese Steel Division, The American Brake Shoe and Foundry Co., 389 E. 14th St., Chicago Heights, Ill.**

★ ★ ★

**CRANE SAFETY LIMIT STOP,** to prevent over-travel of crane hook when hoisting, operates by means of counterweighted lever and suspended reset weight. As hook approaches its limit of travel, reset weight is raised, thus allowing counterweight to trip switch. Quick make-and-break mechanism opening normally closed power contacts to disconnect motor from line and closing another set of contacts to connect resistor across motor cir-

cuit is said to establish smooth, quick, dynamic braking. Taps provided in resistor to adjust braking in accordance with service conditions. When limit stop is in tripped position, bypass circuit is established which permits backing out of limit at slow speed. Features: Completely inclosed case keeps out rain, snow, ice and dirt; neophrene gasket makes switch waterproof; limit stop may be mounted on any of four quadrants; ball or needle bearing throughout with provision for greasing; standard contactor parts and blowouts used throughout; flexible leads brought out through bushings in case with lugs for external connecting. Rating 100 hp. at 230 v., d.c.—**Cutler-Hammer, Inc., Milwaukee, Wis.**

**WHEN BIDDING IS TIGHT**
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**GASOLINE POWERED VIBRATOR**

On closely figured jobs you have the advantage of lower production costs when you are equipped with these powerful, efficient tools that save on power, time, labor, material and still leave a substantial margin for profit. The popular priced 3 H.P. Vibrator, shown above, operates all day on 1½ to 2 gallons of gasoline and is adaptable to all types of concrete construction. It assures greater density and watertightness, lower absorption, better bond with reinforcement, less volume change and earlier stripping of forms. Attachments can be furnished for *Surfacing, Sawing, Sanding, Wire Brushing, Grinding, Pumping, Drilling and Sharpening Tools.*

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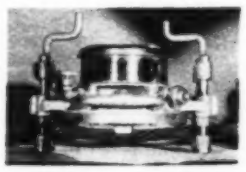
**"PA HASTA' RIDE ALONG T' WATCH LINE TENSION"**

Different tension problems require different solutions... but to quickly and accurately *know* the load on any wire line or cable in the field, use a Martin-Decker Tension Indicator!

No wrenches needed, and no paper calculations or deadending required. Just clamp it on the line and read the dial. It tells — to the pound — the *actual load* as it falls on the line. It catches surging impact loads (which do the damage but are hard to calculate) and strong, steady pulls with equal efficiency. You get information that goes a long way toward increasing the safety and economy of your lines and cables.

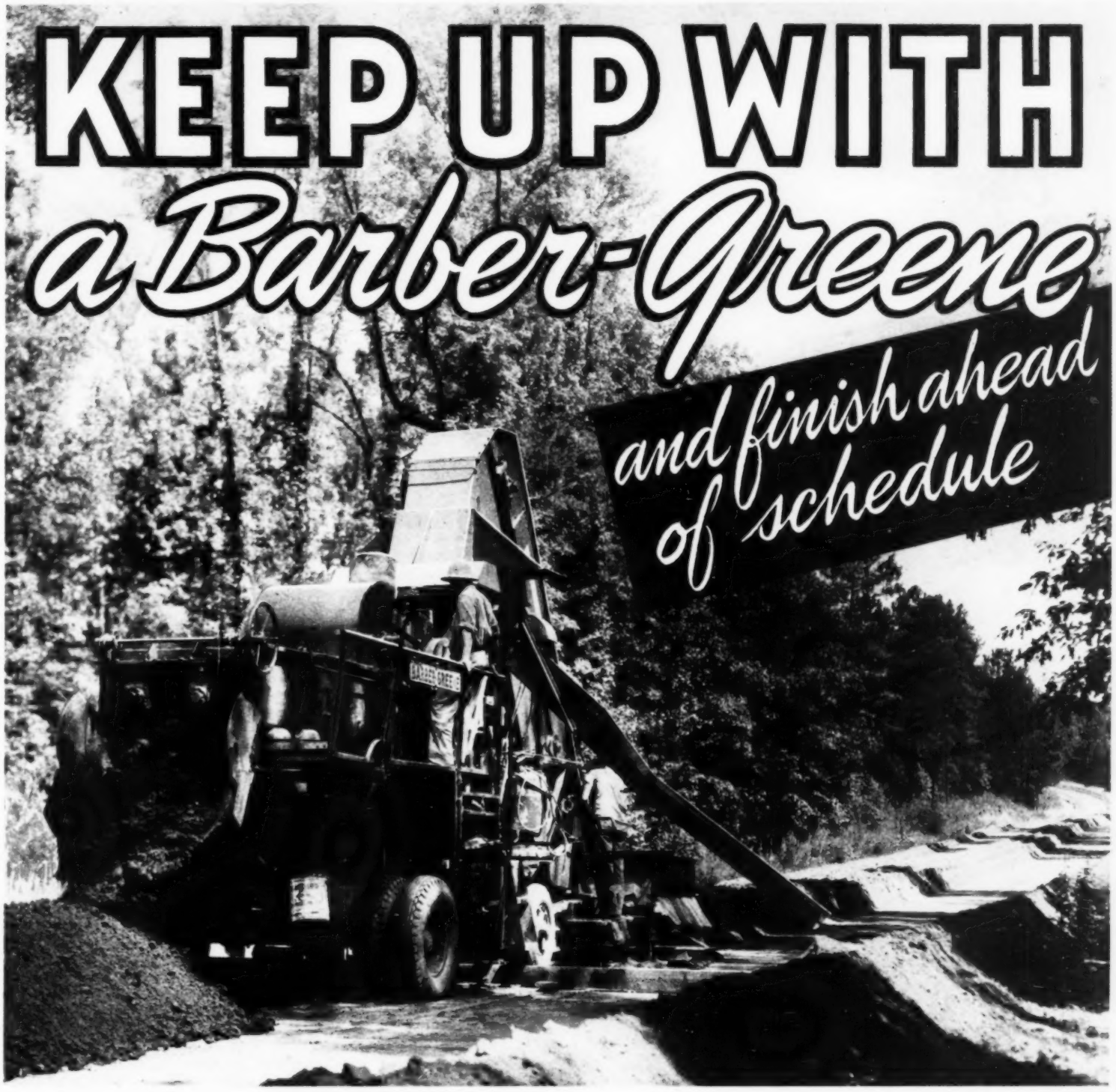
Three models available for lines from 3/16" to 2¼" in diameter. Fully adjustable for temperature changes. Write for details, and ask also about the Martin-Decker Measuring Line Weight Indicator!



**MARTIN** HOME OF THE WEIGHT INDICATOR **DECKER CORP.**
LONG BEACH, CALIFORNIA

# KEEP UP WITH *a Barber-Greene*

*and finish ahead of schedule*



LET a Barber-Greene Mixer set the pace on your next bituminous job.

Here, the Hardaway Construction Company is using a B-G Normal Duty Travel Plant on a 14-mile sand asphalt job in southern Mississippi. Mixing two yards of loose material per minute, this plant is living up to its reputation for speed, economy, and perfection. Operating continuously and consistently, the entire job is functioning smoothly on a stiff production schedule. When this project is finished, the Barber-Greene will be easily moved to the next location ready to handle whatever mix is needed, either in Central or Travel Plant work.

There's no reason for having less than a Barber-Greene. It's available in four sizes, Heavy Duty, Normal Duty, Utility, and the new B-G Maintenance Plant. You should have complete information. Just write. There is no obligation.

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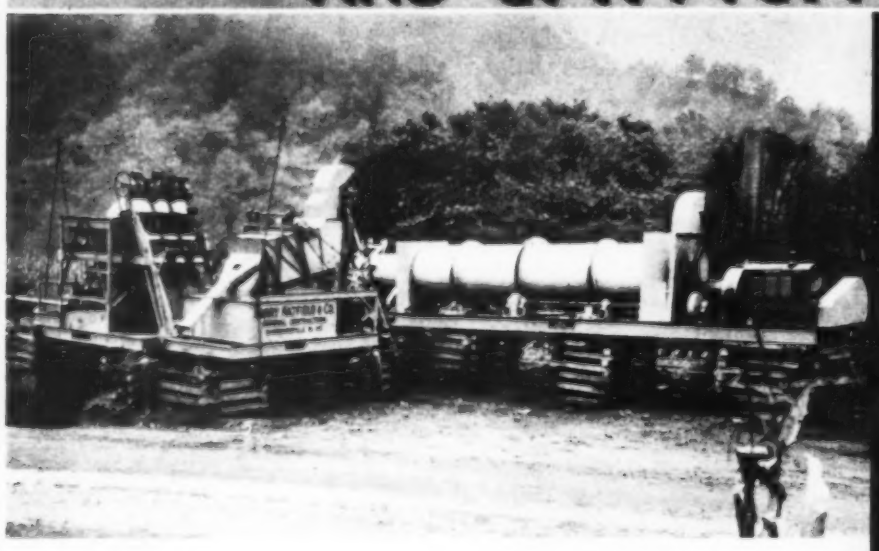

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The new model MH plant—in three units—all wheel mounted and all remaining on the ground during operation. Full size 2500 pound pugmill mixer—dial aggregate scales—fluidometer system—ample drying capacity. Will meet state and federal plant specifications.

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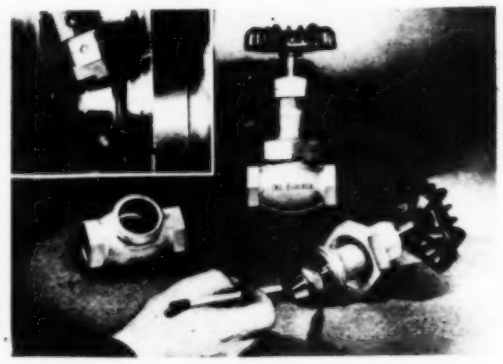
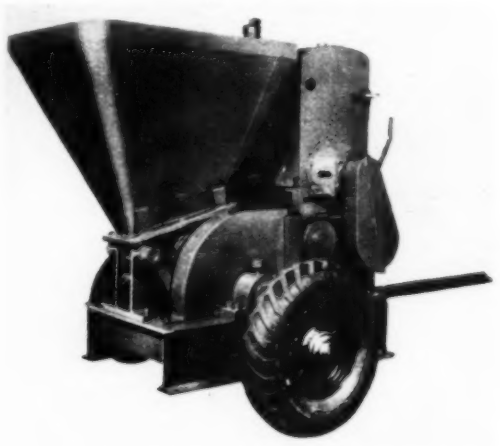


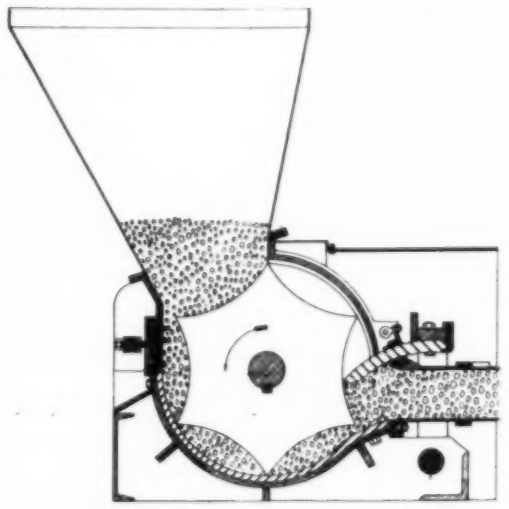
**SUPERFINISH FOR VALVES** is made possible by "honing"—actual rubbing and scrubbing with abrasives to produce highly polished wearing surface which eliminates almost last trace of friction. Makers claim that through use of this development life of valve seats and disks in Hancock "500 Brinell" valves is increased twelvefold. In numerous breakdown tests on valve-testing machines, Superfinished valve seats and disks outlasted others twelve times. —**Hancock Valve Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn.**

★ ★ ★

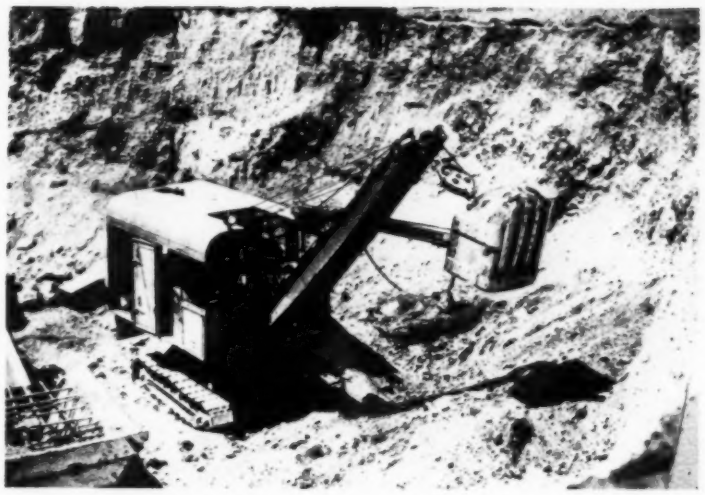
**NEW CONCRETE PUMP,** named Rotogate, employs rotary principle to force concrete or other semi-fluid materials through pipe line. Slow-motion rotary pump has only two moving parts: a pocketed rotor and a gate or cleaning device. Mixed material in hopper feeds by gravity into pockets of rotor, which



forces material through discharge throat into pipe line. Discharge is positive and continuous, and output per revolution is constant regardless of rotor speed, whether one revolution per hour or 10 r.p.m. Effective pumping range depends on friction in pipe line and power of driving unit. Available in three sizes: 20, 40 and 60 cu.yd. per hour, mounted on



skids or wheels, with 6-, 8- or 10-in. diameter straight or curved pipe with quick-coupling joints. Other sizes from small grout or plaster pumps to large units of 250 cu.yd. per hour capacity can be built to order. Gasoline, diesel or electric power.—**The Rotogate Pump Corp., 600 S. Michigan Ave., Chicago, Ill.**



# 15% BETTER EFFICIENCY ON CONTRACTOR'S EQUIPMENT WITH STANDARD RED CROWN

Wouldn't you like to know exactly how efficient your equipment is? Gasoline mileage doesn't mean much where trucks, tractors and shovels are operated together on a job, but a Standard Automotive Engineer can tell you just how efficiently each individual unit is operating. He can also tell you why any unit is not efficient and what to do about it.

Here's an example. A Wisconsin contractor was having trouble with "vapor-lock." In addition, low gasoline mileage on his trucks suggested that fuel consumption on his tractors and shovels might also be high. A Standard Automotive Engineer surveyed the equipment with his instruments, pointed out certain mechanical troubles, and recommended Standard Red Crown gasoline.

After the changes had been made, a final analysis by the Engineer showed an average increase of 15% in efficiency in the fleet. Vapor-lock difficulties had also stopped.

To be sure that next season your equipment will be off the job as little as possible, check now with the Standard Automotive Engineer in your locality. Let him work with your maintenance men. The facilities and experience he has for accurately measuring fleet engine efficiency will be a great help in assuring you trouble-free operation next season.

Refer to the list of cities here for the Engineer nearest you.

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One Iowa unit in a baking company system has a record for the lowest operating costs of any fleet in the company. The truck pictured below has operated 270,000 miles at a cost of approximately

2.5c per mile including fuel, lubricants, maintenance, labor and parts, and depreciation.

Even in this economically operated fleet the maintenance superintendent finds Standard Automotive Engineering service valuable. No matter how careful fleet maintenance plans are laid, problems arise periodically where the experience and special knowledge of fuels and lubricants which these Engineers have can be helpful. Their scientific methods of locating trouble are welcomed by most maintenance departments. Why don't you find out what one of these Engineers can do for you?




**BUS OPERATOR** finds Standard Red Crown and Iso-Vis Motor Oil "cannot be beat at their price." This operator is Mr. Ralph Spiekerman, owner of the Saginaw-Zilwaukee (Mich.) Bus Co. The picture shows Mr. Spiekerman, in the bus, with Standard Oil Agent Wm. Robinson. Mr. Spiekerman tried many brands of gasoline and motor oil and made his own decisions based on operating costs and reliability of operation. You can make your own comparisons, but a Standard Automotive Engineer will be glad to help.

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| Chicago, Ill. | Evansville, Ind. | Kansas City, Mo. | Quincy, Ill. |
| Davenport, Iowa | Fargo, N. Dakota | LaCrosse, Wis. | Saginaw, Mich. |
| Decatur, Ill. | Grand Rapids, Mich. | Mankato, Minn. | St. Joseph, Mo. |
| Denver, Colo. | Green Bay, Wis. | Mason City, Iowa | St. Louis, Mo. |
| Des Moines, Iowa | Huron, S. Dakota | Milwaukee, Wis. | South Bend, Ind. |
| Detroit, Mich. | Indianapolis, Ind. | Minneapolis, Minn. | Wichita, Kan. |

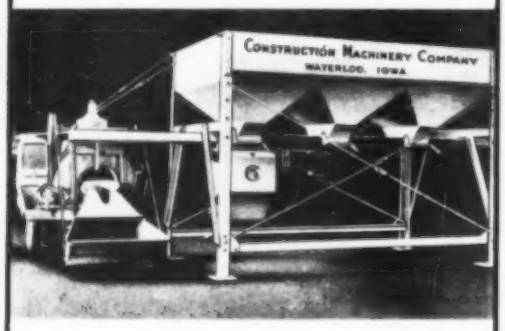
Copr. 1941, Standard Oil Co. (Ind.)

# STANDARD OIL COMPANY (INDIANA)

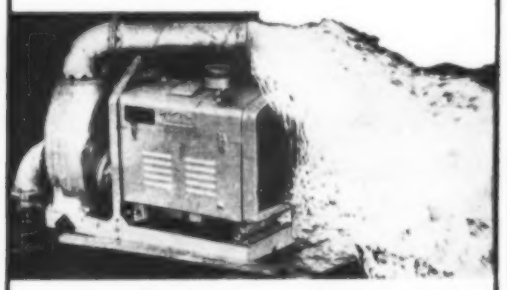
**LUBRICATION ENGINEERING** *THE RIGHT LUBRICANT • PROPERLY APPLIED TO REDUCE COSTS*

# CMC's

## GREAT NEW MONEY-MAKING EQUIPMENT LINE FOR 1941!

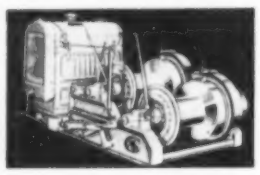



**The new CMC Bin Batcher sets a new "high" in profit-making equipment. Takes the advantages of a central mixing plant to every job at remarkably low cost. Used with a CMC 10S or 14S Mixer makes a hard to beat, high producing, cost cutting, concrete producing unit.**



### CMC DUAL PRIME PUMPS

**Doubly fast—doubly sure. Only Dual Prime gives you two priming actions. That means extra dependability. Sizes from 1½" to 10"; also special well point and high pressure pumps.**



**CMC Hoists—low priced—high quality. Single and double drum up to 40 H. P.**

### LOOK AT CMC BEFORE BUYING!

**See the latest in Mixers, Tilters from 2½ to 10 cu. ft. Non-tilts up to 1 yard. 1 and 2 bag hoe type. Bin batchers, Pumps, Hoists, Power Saws, Carts and Barrows.**

**CONSTRUCTION MACHINERY COMPANY**
**WATERLOO, IOWA**


**SINGLE BUCKET SCRAPER.** 8.2 cu.yd. struck and 11 cu.yd. heaped capacities, incorporates several new features: (1) Loading is made easier by longer and steeper blade base which causes material to boil in, to flow back into bowl and forward into apron; (2) additional yardage made possible by higher sides and built-up apron which retains full loads and prevents spilling; (3) newly designed A-frame gives more room for bigger loads, speeds

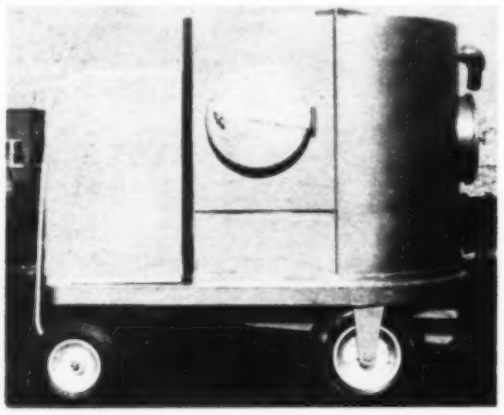
up loading, facilitates dumping of sticky materials and also adds structural strength. With apron cable dead ended on apron, all hoist and unloading cables are now placed up and out of earth, eliminating abrasive cable wear. Power demands of larger loads said to be reduced by centering fixed sheaves so that direct pull is attained on positive ejection tailgate. Carryall may be fitted with either four or six large tires, as desired, to give ample flotation and necessary compaction. Gooseneck-type yoke assures plenty of tire clearance under reasonable conditions, makers claim—**R. G. LeTourneau, Inc., Peoria, Ill.**

★ ★ ★

**RUBBER PUTTY** named Plastikon, is said to be adaptable to many uses in building and industry because of its ability to maintain airtight and moisture-proof seals. Claimed to retain degree of plasticity for long periods, not to harden, dry out or crack. Also said to have great resistance to deteriorating effects of corrosive chemicals, chemical fumes and salt spray, and to adhere strongly and permanently to wood, steel and glass despite action of sunlight. Available in red, black, grey, green and gun metal. Applied with putty knife or calking gun. Smears may be wiped off with kerosene or gasoline.—**B. F. Goodrich Co., Akron, Ohio**

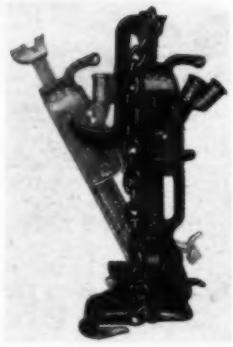
★ ★ ★

**ROCK DRILL DUST CONTROL MACHINE.** compact in size and light in weight, has ample capacity for 8-hr. run of two 2⅝-in. bore drills or one 4-in. bore drill. Storage chamber equipped with single gate bottom discharge can be emptied while machine is in operation without closing down system. Approved by New York State for distances up to 100 ft. from drills, giving overall working range of 200 ft. without moving machine. Dimensions: 3 ft. 4 in.



wide, 5 ft. 7 in. high and 6 ft. long. Mounted with roller bearings on pneumatic-tired wheels, 1,200-lb. unit is moved easily on level ground by one man. Powered either by gasoline engine or electric motor, unit is furnished complete with hose and hoods ready for operation. No pipe fittings required on machine; all connections are slip sleeve type. Unit has found wide acceptance for purposes other than rock drill dust collection in airplane factories, textile mills and government projects. Larger portable unit now is under development for four jackhammers or two wagon drills.—**Markley Dust Control System, Inc., 306 E. 123rd St., New York City.**


## Increase your Manpower with no increase in payroll



**20 men can lift 5 tons—one man can do the same with a Simplex No. 522 Emergency Jack. You'll pay out many times its small cost if you don't have one on hand to do the innumerable pushing, lifting, lowering and supporting jobs that come up daily on every construction job.**

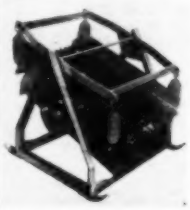
**The No. 522 lifts a full 5-tons on cap, toe, auxiliary cap shoe or on the hooked chain. Tilts on base for angle jacking. Double socket for close-quarter jacking. As tough as they are handy. No. 310-A lifts 15-tons; No. 2030, 20 tons. Catalog 40 shows dozens of construction jacks.**

**TEMPLETON, KENLY & CO., Chicago**
***Better, Safer Construction Jacks Since 1899***

### Simplex Jacks

dependable and efficient
Lever Type for toe and cap lifting.
Hydraulic for easier cap lifting.
Screw Jacks for economy.

## A PORTABLE VIBRATING SCREEN



**Uses only the power of 2 H.P. gas engine or 1 H.P. electric motor.**

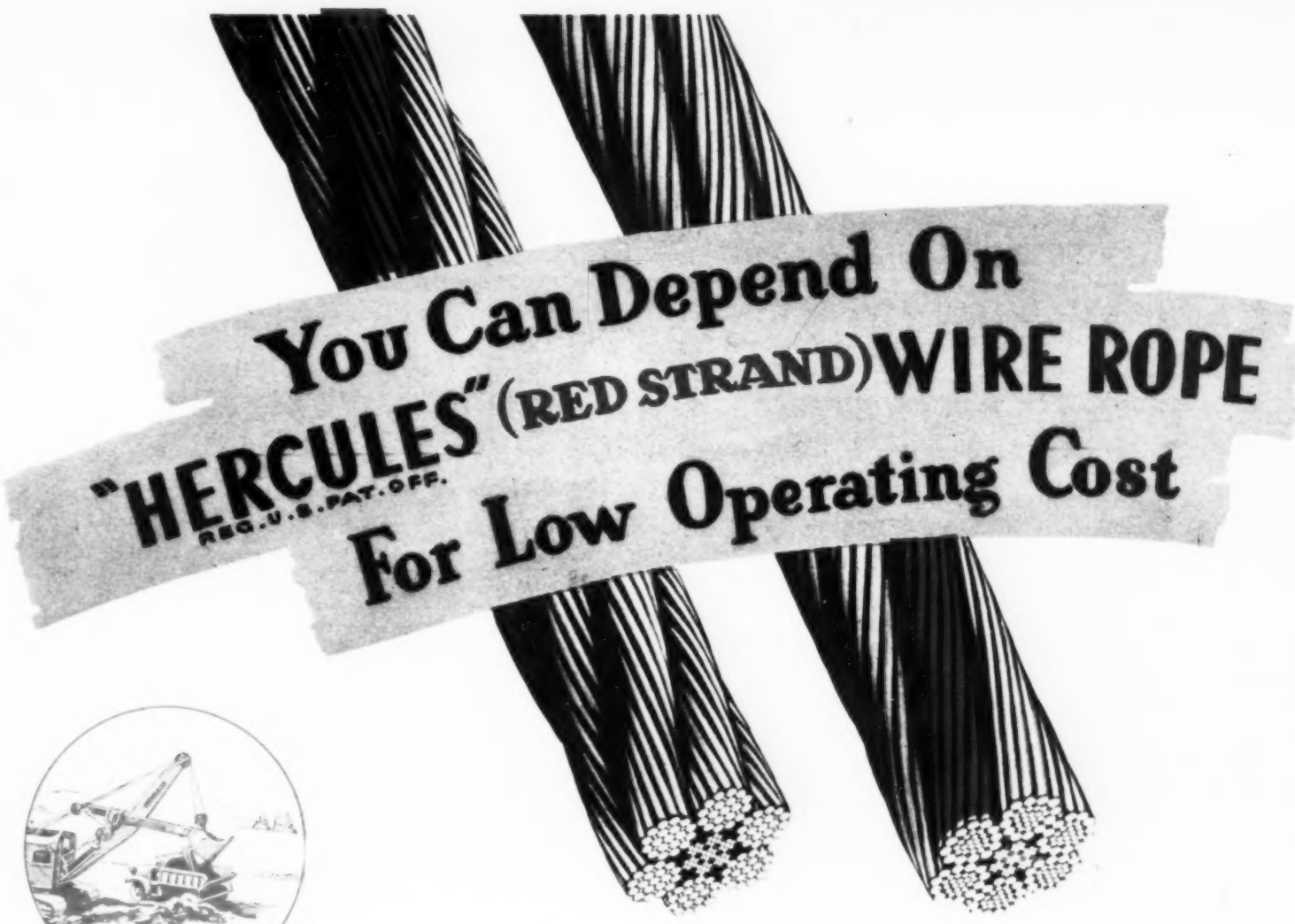
**This husky little double-deck Vibrating Screen will pay for itself over and over again in practically every plant. Accurately separates three sizes of 100 tons of material per day. Self-contained so can be moved from place to place or mounted permanently. Equally desirable for maintenance work or production. Low priced, dependable, efficient.**

***Send for Portable Screen Circular No. 110 and prices***

**ROBINS CONVEYING BELT COMPANY, PASSAIC, N. J.**

BOSTON CHARLESTON (W.VA.) CHICAGO CLEVELAND
DETROIT NEW YORK PHILADELPHIA
PITTSBURGH SAN FRANCISCO

ROBINS



# You Can Depend On "HERCULES" (RED STRAND) WIRE ROPE For Low Operating Cost

REG. U. S. PAT. OFF.

*Correct construction is also an important factor in wire rope economy. In "HERCULES" there is a right rope for every purpose, as it is furnished in both Round Strand and Flattened Strand constructions—all of which are available in either the Standard or Preformed type.*

Production requirements must be met. Why not let "HERCULES" (Red-Strand) Wire Rope help you meet this demand and still maintain a reasonable margin of profit?

You can rely on "HERCULES" to keep costs down, because it is made on the principle that—*"With wire rope it pays to use the best"* . . . In its entire process of manufacture, exacting tests and rigid inspections leave nothing to chance. All this, plus manufacturing efficiency, means longer rope life at no higher cost.

You will quickly discover that "HERCULES" (Red-Strand) Wire Rope is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production. Specify it on your next requisition.

MADE ONLY BY

**A. LESCHEN & SONS ROPE CO.**

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

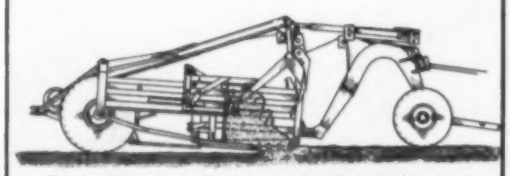
NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street
SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

*With LeTourneau* **DOUBLE-BUCKET CARRYALLS**

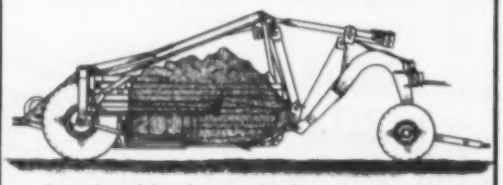
*you can* **GET MORE YARDAGE**

**from Your Tractor Power . . .**

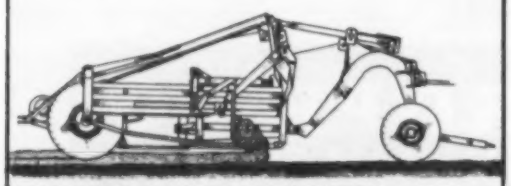
*Model LU loading. This double-bucket Carryall has the same 8' 6" cutting edge as the ordinary 8 or 9-yard scraper, requires no more loading power than the normal 12 to 15-yard scraper, but has a capacity of 19 heaped yards.*



Start of load—telescoping bucket in forward position. Notice that material piles up at rear of scraper bucket.



Completed load—rear bucket returns to end of scraper on roller bearings, carrying material full length of scraper.



Complete ejection—rear bucket also moves forward, with ejection tailgate wiping sides and bottom clean of all load.

Made in 4 Sizes

| | |
|---|---|
| *LU | 19 yard heaped capacity for D8 or B Tournapull |
| **FU | 23 yard heaped capacity for D8 |
| **RU | 30 yard heaped capacity for D8 or A Tournapull |
| **NU | 45 yard heaped capacity for D8 or A Tournapull |

*8-6' cutting edge **10' cutting edge

## Reduce Loading Effort • Increase Yards per Horsepower • Proved by 4 Years' Use

You get more yardage from your tractor power because loading a double-bucket, in effect, is like loading two small scrapers one after the other. To begin loading, the rear bucket telescopes forward (see operating sketches). The material loaded into this shortened bowl travels back on rollers and roller bearings instead of being forced back. Result: less loading resistance plus a larger and better heaped load, with no empty corners.

### *Smart, Load-Expanding Design*

The yardage you can put into a conventional single bucket scraper with 90 to 100 H.P. naturally is limited by:

1. Bowl height
2. Width of cutting edge
3. Bowl length

Practical experience has fixed bowl height at 4 to 5 feet. Shipping requirements limit cutting widths to 10 feet maximum. And, until the advent of the double-bucket Carryall, the power required to force dirt back pretty well limited bowl length. Then came the revolutionary LeTourneau double-bucket Carryall. With this revolutionary double-bucket design, you retain the same bowl height . . . can use the power-saving, narrower cutting edge of a conventional 8 or 9-yard scraper . . . yet, because power is conserved by this unique method of loading into one bowl and rolling it back, you're able to expand bowl length and increase capacity as much as 50%.

It's proved by 4 years of use by leading contractors the country over. Plenty of repeat orders show it's a profit-maker. Simple, easy to operate. Patented and available only from LeTourneau. Ask your LeTourneau-"Caterpillar" dealer to show you how a double-bucket Carryall can step up your yardage. See him NOW.

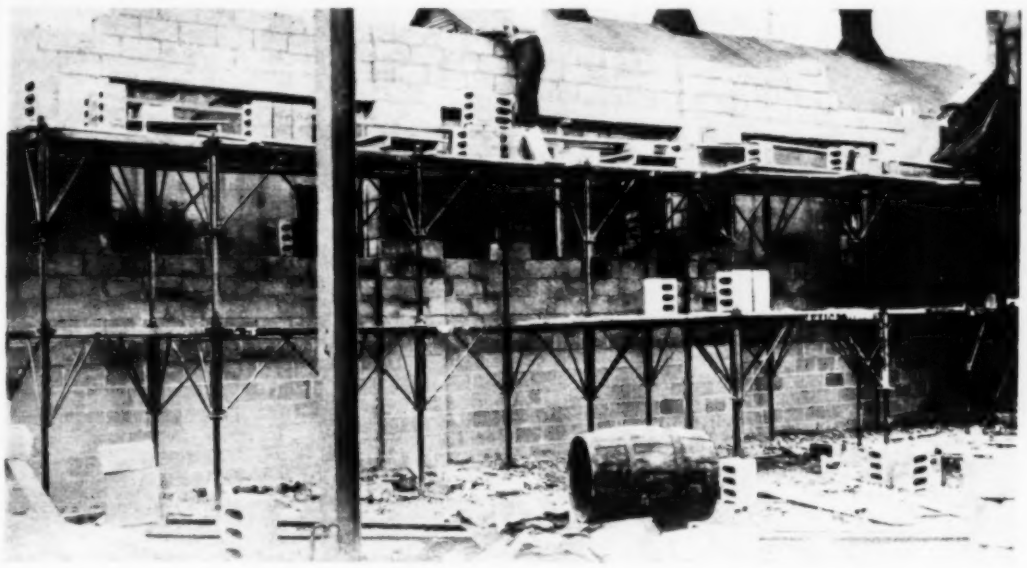
SEE OPPOSITE PAGE FOR ADDED ADVANTAGES

# LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

*For Lowest Net Cost per Yard*-CARRYALL* SCRAPERS, ANGLEDOZERS*, CRANES, BULLDOZERS, POWER CONTROL UNITS, DRAG SCRAPERS, PUSHDOZERS, SHEEP'S FOOT ROLLERS, ROOTERS*, TOURNAPULLS*, TOURNATRAILERS*, TOURNACRANES. *Name Reg. U. S. Pat. Off.

**STEEL SAFETY SCAFFOLD.** for use of building contractors, electricians, painters, decorators and maintenance departments of private and public buildings, is said to provide interchangeability with minimum number of separate units. No screws, bolts or nuts are used, and no tools are necessary to erect or disassemble scaffold. "Quick-Set" scaffold consists of square section tubular steel brace and corner post

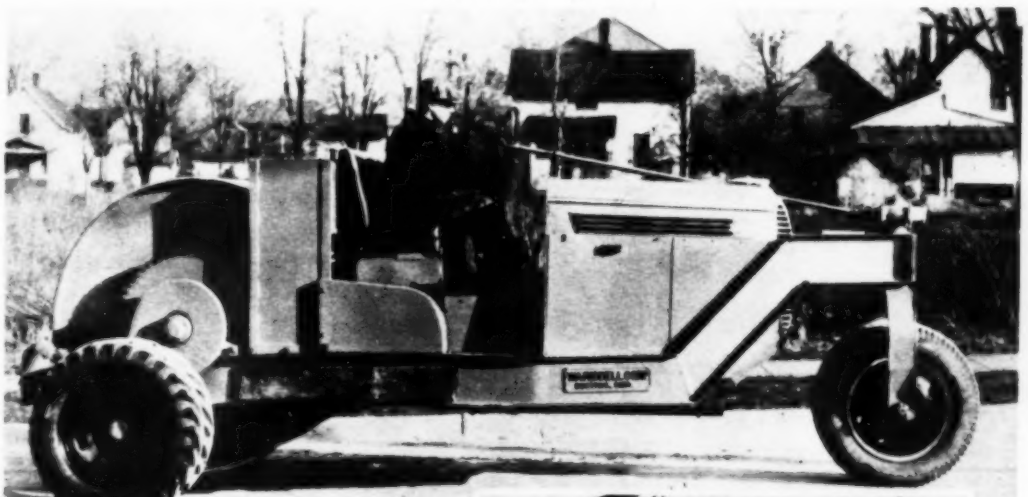


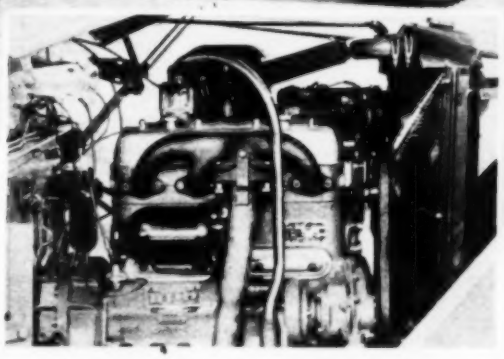
units of rigid construction with electrically welded parts for quick erection. Design permits installation in straight line, in corners, around rectangular or circular construction either inside or outside. Bridging is accomplished with truss units. Also are provided steel floor sections, detachable ladders, adjustment posts, brackets for "catwalks", casters for use on interior work and skip hoist for elevating material to desired level. — **Mechanical Handling Systems, Inc., 4600 Nancy Ave., Detroit, Mich.**

★ ★ ★

**LINOLEUM CEMENT.** marketed under name of Linowall Cement, is of type popularly known as casein-latex or rubber cement, but basic formula is said to differ from that of ordinary cements offered under this general classification. Lighter color said to be of definite advantage in hiding seams, especially with patterns of delicate shades. Cement claimed to have little or no odor and high degree of stability in can. Has spreading capacity of approximately 150 to 175 sq.ft. per gallon. No rolling necessary. Water repellant, but not waterproof. Rustproof cement is recommended for use with this new adhesive for waterproofing seams and edges where excessive moisture is encountered. Sizing not necessary except when working on old or new walls that are chalky, dusty or porous. — **Armstrong Cork Co., Lancaster, Pa.**

★ ★ ★





**GENERAL PURPOSE ROAD ROLLER.** known as "Whizzard", has been built to handle work usually performed by 6- to 8-ton rollers and is said to have added advantage of speedy transportability. Is equipped with pair of dual pneumatic-tired rear wheels mounted on assembly at rear of frame, which, together with transport gear, swing back with hinge-like action out of way of roller when unit is in operation. When job is completed, these wheels are quickly swung into road position engaging gear in driving mechanism and stepping up speed for driving roller on pneumatic tires at regular traffic speeds. Entire change-over for transportability and reverse operation said to be made by one man in less than 4½ min. Two steel plate, electrically welded, watertight compression rolls with combined rolling width of 44 in., may be filled with water or material to add approximately 3,300 lb. weight. Eighty-five per cent of total weight of machine is carried on rollers, only sufficient weight being carried on front end and tires to facilitate easy steering. Roller speed 1½ to 6 m.p.h. Powered by 4-cylinder Hercules diesel engine, 4x4½-in. bore and stroke.—**W. A. Riddell Corp., Bucyrus, Ohio.**

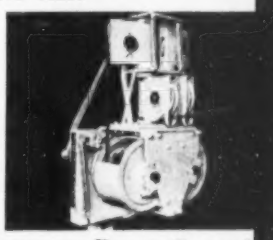

You Get These Job-Proved
Profit-Making Features
on All LeTOURNEAU
Carryall

They Assure You Faster,
Smoother Job Operation

1 POSITIVE EJECTION

The LeTourneau sliding tailgate operates *independently* of the apron . . . wipes the bowl clean of all material, even though it be sticky, heavy gumbo . . . enables operators to control accurately both the ejection flow and depth of spread. This tailgate design for positive ejection is expensive to build, yet the cost to you of a LeTourneau Carryall is no more than for conventional, gravity-dump scrapers of comparative size.

2 CABLE CONTROL



Fast-acting, patented 2-line control enables you to operate apron lift independently of tailgate, thus fill scraper bowl regardless of material. LeTourneau Power Control Unit is unaffected by heat or cold. More than 10,000 now in use.

3 BIGGER TIRES

LeTourneau Carryall yoke and rear frame is specially designed for big tires and has ample clearances so you can add extra tires for extra-soft conditions. Result: your tire upkeep is less, you're able to go to work sooner after rains, and can work in softer going. Only LeTourneau Carryalls are designed so you can use bigger tires or duals all around.

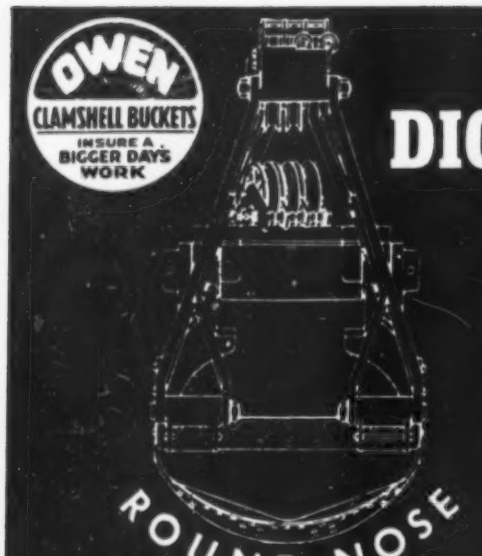
4 TIME-SAVING SALES AND SERVICE FACILITIES

LeTourneau Carryalls are stoutly constructed to give you long, uninterrupted service even under punishing working conditions. When repairs do become necessary, parts stocks and mechanical service are available from "Caterpillar" dealers in more than 100 cities and towns in the United States.

Only from LeTourneau do you get all these money-making yardage-increasing features.

Ask your LeTourneau-"Caterpillar" dealer to show you NOW how they can increase your profits

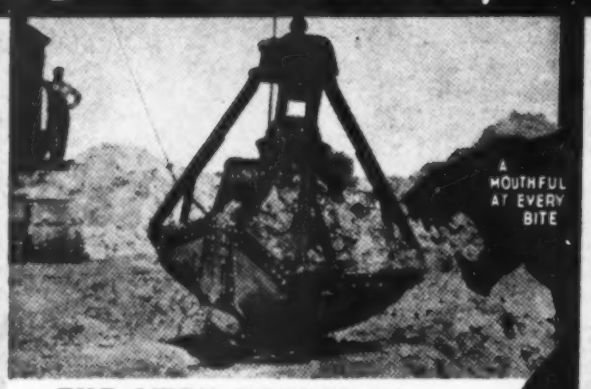
LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA




Distinctive
DIGGING FACTORS

In digging with an Owen round nose bucket, the total pressure is exerted on a portion of the cutting edges at the center of the lips. Before this weight becomes distributed over the entire width of the cutting edges, the lips have penetrated deep into the material with a carving action. This gives larger grabs and lowered operating costs.

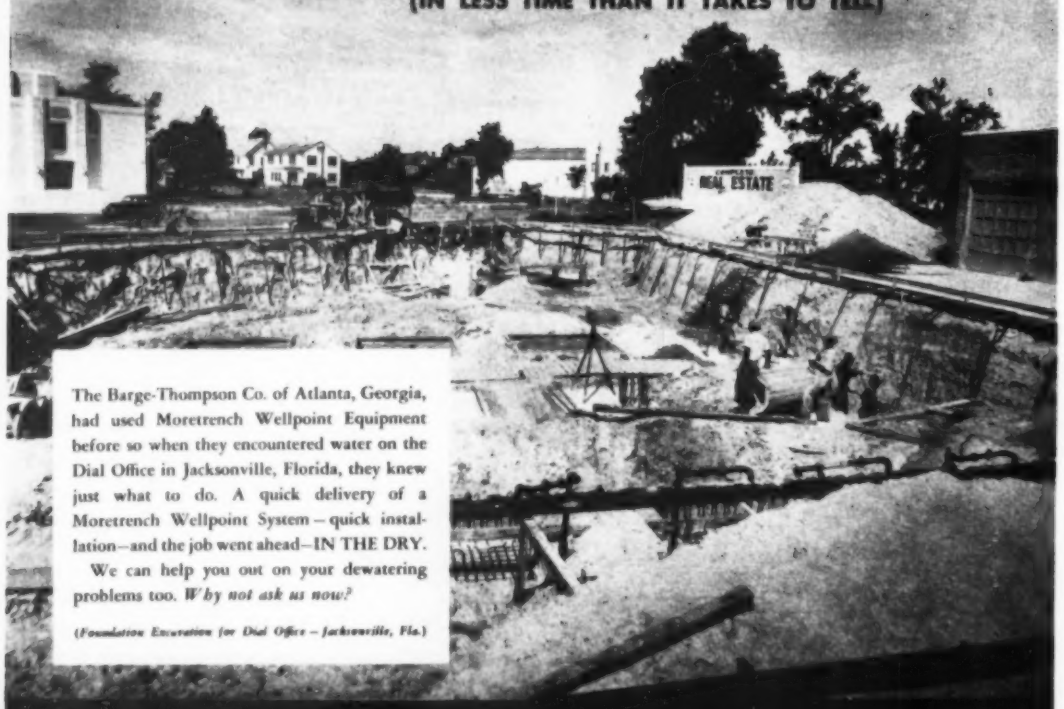
ROUND NOSE for GREATER penetration




THE OWEN BUCKET CO.
6020 BREAKWATER AVE., CLEVELAND, O.
BRANCHES: New York, Philadelphia, Chicago, Berkeley, Cal.



Ready for Concrete
(IN LESS TIME THAN IT TAKES TO TELL)




The Barge-Thompson Co. of Atlanta, Georgia, had used Moretrench Wellpoint Equipment before so when they encountered water on the Dial Office in Jacksonville, Florida, they knew just what to do. A quick delivery of a Moretrench Wellpoint System – quick installation—and the job went ahead—IN THE DRY.

We can help you out on your dewatering problems too. *Why not ask us now?*

*(Foundation Excavation for Dial Office – Jacksonville, Fla.)*

MORETRENCH CORPORATION
Main Office: 90 West Street, New York — Plant: Rockaway, New Jersey
Branch Warehouses: Joliet, Illinois and New Orleans, Louisiana


# NEWS FROM MANUFACTURERS
## *About Their Products*

***The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.***

PRESSURE-CREOSOTED POLES — **The Wood Preserving Corp.,** Pittsburgh, Pa. (20 pp., illustrated). Contains comparative costs and length of life of treated and untreated poles, a discussion of their specifications and use and tables showing characteristics and sizes of various species of pole timber. A graph and cost examples compare annual cost of treated and partially treated poles. Also are recommended standard specifications for pressure creosoted southern pine poles as well as for creosote used in their treatment. Other information such as methods of measuring sweep and crook in poles, weights of southern yellow pine poles after creosote treatment, minimum carload weights, dimensions of various species of poles and breaking loads are included in booklet.

★ ★ ★

JACKS—**Templeton, Kenly & Co.,** 1020 S. Central Ave., Chicago, Ill. (60 pp., 3¾x6¾-in. size, illustrated.) "Junior" catalog of vest-pocket size describes construction, application and gives specifications for more than 300 sizes and types of Simplex jacks. Line includes automatic raising and lowering jacks, screw jacks, journal jacks, geared jacks and more specialized jacks for various industries, such as mining, oil, utilities, railroad, aircraft, construction and marine. Sizes range from 1½-ton truck jack and 5-ton single-acting automatic raising and lowering jack to 50-ton 4-way head type thrust bearing screw jack.

★ ★ ★

TARPAULINS—**H. Wenzel Tent & Duck Co.,** 1035 Paul St., St. Louis, Mo. (12 pp., illustrated.) Points out how "weather insurance" on construction work is made possible by use of tarpaulins, especially as windbreaks for concreting in cold weather and for protection of materials and equipment from rain. Specifications are given for seven different brands of Para tarpaulin (16-24 oz.) waterproofed by paraffin treatment. Sizes range from 6x8 ft. to 24x36 ft. Features include double-stitched seams, hook-stitched hems, rustproof grommets and eyelets clinched in double thickness of canvas to prevent pulling out. Table of prices. Photos illustrate varied applications of tarpaulins.

★ ★ ★

WINTER CONSTRUCTION EQUIPMENT — **Aeroil Burner Co., Inc.,** West New York, N. J. (24 pp., illustrated.) Describes line of kerosene burners and heaters, including concrete heaters for both tilting and non-tilting drums, portable coil water heaters, oil-burning smokeless salamanders, steam-thawing outfits, thawing torches and thawer for frozen ground. Specifications and prices. Double-coil water heater produces 1,600 gal. of hot water per hour with a 50-deg. F. rise in temperature.

★ ★ ★

HOSE MASKS — **Mine Safety Appliances Co.,** Braddock, Thomas & Meade Sts., Pittsburgh, Pa. (8 pp., illustrated). Deals with application of the All-Vision facepiece to company's line of hose masks including combination, utility, standard and special models. Masks now have facepieces of increased area and lenses of non-fogging, laminated shatterproof glass which are contoured at the sides to fit wearer's face. Said to provide gas-tight seal, eliminating pressure points. Minimum dead air space cuts down re-breathing of exhaled air. Facepiece may be sterilized at will and is said to give lengthy service life.

● Here's a new water-weight tandem roller (available in 5-to-8 ton and 8-to-10½ ton sizes) that sets new standards for stability, visibility, ease of handling . . . and pendulum-smooth rolling action.

Other features that make this latest addition to the A-W line a standout in tandem roller design, construction and performance are: (1) Unusually low center of gravity; (2) Rigid box frame; (3) Smooth, instant acting hydraulic steer; (4) More ground clearance beneath side plates and less side overhang combine for safe, easy rolling near curbs.

Ask us to give you complete specifications on these velvet-smooth performers. When you see how many practical improvements they provide, you'll agree that for maximum performance and economy your next tandem roller must be an Austin-Western. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

MOTOR GRADERS
LOADERS
BLADE GRADERS
ELEVATING GRADERS
HYDRAULIC SCRAPERS
CRUSHING AND
SCREENING PLANTS

**Austin-Western**

CABLE SCRAPERS
ROLLERS
ROLL-A-PLANES
MOTOR SWEEPERS
BITUMINOUS
DISTRIBUTORS
SHOVELS AND CRANES

# Now . . . GET High-Early STRENGTH

WITH REGULAR PORTLAND CEMENT BY ADDING High Early POZZOLITH

Regular Portland Cement can be speeded up so that you get 3 day strength in 1 day, 7 day strength in 3 days, 28 day strength in 7 days — by adding only two pounds of High Early Pozzolith to the sack of cement.

In addition to speed in hardening you reduce the excess water, increase the placeability and get far less segregation and honeycombing. You strip forms faster, require less forms, carry only one class of cement on the job.

Reduce your cold weather costs with High Early Pozzolith and save time and money. Get all the benefits of high early strength concrete from Regular Portland Cement purchased at economical prices.

**HOW POZZOLITH IMPROVES CONCRETE**

Pozzolith contains Master Builder's cement dispersing agent. Cement particles in their normal state in water tend to gather together in bunches; i.e. flocculate. This bunching entraps water within the particle clumps. See microphotograph below.

With Master Builders' dispersing agent these bunches are broken up into individual cement particles distributed throughout the water; i.e. dispersed or deflocculated. See microphotograph below.

This dispersion makes the cement usable to its full efficiency; all the cement surface is made available for hydration and all the water for lubrication of the mix. (Water held within the particle clumps is released.)

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Greater workability with less water.

Increased strength.

Watertightness.

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**THE MASTER BUILDERS COMPANY**
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**MASTER BUILDERS**


VERTICAL PUMP MOTORS—**Westinghouse Electric & Mfg. Co.**, Dept. 7N20, East Pittsburgh, Pa. (8 pp., illustrated). Describes complete line of bullet-type, vertical, hollow-shaft motors designed for deep well turbine pumps and available in squirrel cage, wound rotor or capacitor a.c. and d.c. types. Features of these motors such as moisture proof ventilation, "Tuffernell" insulation and jaw-type safety clutch which prevents damage to driven apparatus are explained and fully illustrated. Cutaway photos and sketches give adequate idea of motor's construction.

★ ★ ★

MAINTENANCE PAINTING HANDBOOK—**American Marietta Co.**, 43 E. Ohio St., Chicago, Ill. (128 pp. illustrated). Said to be first comprehensive guide of its kind in paint industry. Consists of accumulation of reports and records of technical paint questions arising over period of 27 yr. compiled to give results of first-hand experience with paint problems. Indexed for quick reference according to following subjects: Surface preparation, methods of paint application, types of paint that have proved successful under varied conditions. Included are discussions of painting methods for protection against weather, radical temperature changes, climate, moisture, acids, fresh and salt water, smoke, chemicals and dust abrasion. Table to assist estimation of quantity of paint needed to cover various surfaces.

★ ★ ★

## Pay Off For Defense Workers

*(Continued from page 33)*

has now been organized at Charlestown. For transporting workers fleets of motor trucks have been equipped with double rows of wood benches on each side while special pay wagons are operated to distribute weekly checks to employees at various out points on the 9-sq.mi. job site and thus avoid the congestion that would result from paying off at a single job office. Two of these pay wagons in the form of trailers are towed by truck to various areas of the plant where the men are paid in small gangs. Use of these pay wagons, suggested by Lieut. Col. R. E. Hardy, enables an employee to get his pay in 4½ min., including time spent waiting in line.

★ ★ ★

## Small Bore Tunnel PIERCES CONTINENTAL DIVIDE

*(Continued from page 60)*

explosives were used for blasting rock.
Drilling done with detachable bits (Ingersoll-Rand).
On Oct. 21 hit water—flow 250 gal. per min.; grouting resorted to.
Finished diameter of tunnel inside concrete lining, 9 ft. 9 in., circular.
Excavation: 4.8 cu.yd. per foot, supported

*(Continued on page 84)*


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Everyone concerned with sewage problems will find in this book valuable data on modern equipment and up-to-date processes for treatment of sewage. Every important new fact of principle and practice is covered, including actual performance data and operating costs as well as the most efficient methods of operating a sewage plant.

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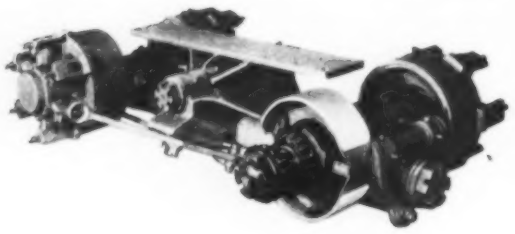
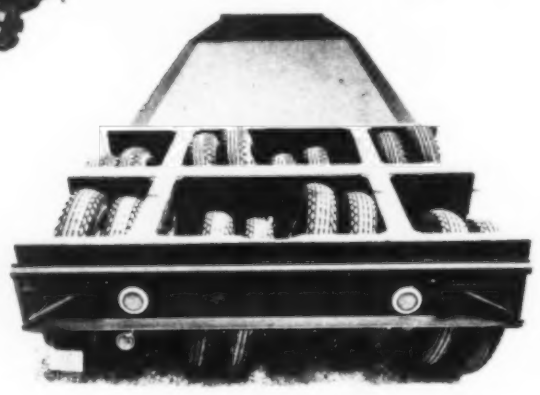


TRAILER service and tire life depend upon vital parts not ordinary visible. Under the rear of the large trailers are two units of great importance. They must carry the load, oscillate lengthwise and crosswise, and be so designed as to keep all eight wheels in permanent alignment. Rogers engineers have met every one of these exacting requirements in the time-tested unit here illustrated. Note the heavy pad that supports one of the two wide-flange H sections, the well-ribbed castings of electric steel, the widely spaced bearings of rocking members, the large area of the brake shoes the heavy cross-section, non-tapering spindle and the two extra large Timken bearings between which the wheel load is equally distributed. When in the market for a trailer investigate, analyze and compare. Meanwhile, write for a copy of the new catalog now in the printer's hands.



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22' x 22'.

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57" high, 50" wide.

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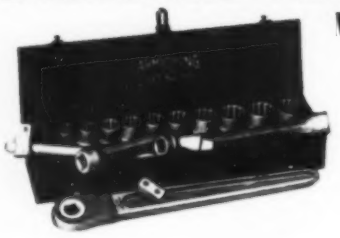
***WRENCHES***



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"The Tool Holder People"
334 N. Francisco Ave.
Chicago, U.S.A.
*Eastern Warehouse & Sales:*
199 Lafayette St., New York


*(Continued from page 82)*

section; 4.1 cu.yd. per foot, non-supported section.

Grade, 0.158 ft. per 100 ft.; east portal 108 ft. lower than west portal.

### Equipment

Drill carriage with four Ingersoll-Rand DA 35 automatic-feed drills mounted, and one extra drill mounted for test holes; this carriage built by company forces.

2 Eimco-Finlay loaders, one in heading and one spare.

Switching in heading done by California switch.

3 Mancha Titan A battery locomotives, 3½ ton capacity for haulage and one gas locomotive for outside work.

15 C.S. Card cars of 91 cu.ft. capacity. These have detachable dump rollers which are taken on and off on the dump. Cars with rollers attached pass over dumping block and are automatically dumped.

Gage of all haulage equipment, 24 in. Rail, 40 lb.

Ventilation by means of 40-hp. Western blower through 20-in. Hardesty vent pipe. Pipe is No. 14 gage metal in 30-ft. lengths. Connections made with flanges bolted together and rubber gasket for each connection.

Water line, 2 in.; air line, 4 in. Track gang advances air, water and vent pipe as required.

Blacksmith shop contains Ingersoll-Rand hot miller, two jack furnaces, lathe, drawing pot, quenching fixtures, etc. for Ingersoll-Rand Jackbits. There is also a No. 50 Ingersoll-Rand sharpener for necessary shanking, etc. Starter bits are 1⅞ to 1¾ in. gage, and each milling reduces gage of bits 1/16 in. All bits are changed outside, there always being one round of steel ready for use in heading; two steel cars are used for this purpose. Steel support furnished by the Colorado Fuel & Iron Co., of Denver, and structural timber from Nebraska Bridge Co.

A diversion dam also is being built, with concrete core wall 3 ft. wide at bottom and about 2 ft. wide on top to divert water from tunnel into conduit, where it starts its journey to the farmers. This dam will form a lake of several acres at tunnel portal.

### Labor and Safety

The American Federation of Labor and the contractor have a working agreement, all men employed being given a certain time to join up with their respective locals. A Safety Club has been organized, and everything possible is being done to make the men safety conscious; meetings held once a month.

### Personnel

For U. S. Bureau of Reclamation: Porter Preston, supervision engineer; C. H. Howell, construction engineer; Frank Matajeko, resident engineer, east portal of tunnel. In addition there are two men for the bureau on each shift for keeping line,

*(Continued on page 86)*

# LOOK IN THIS BOOK

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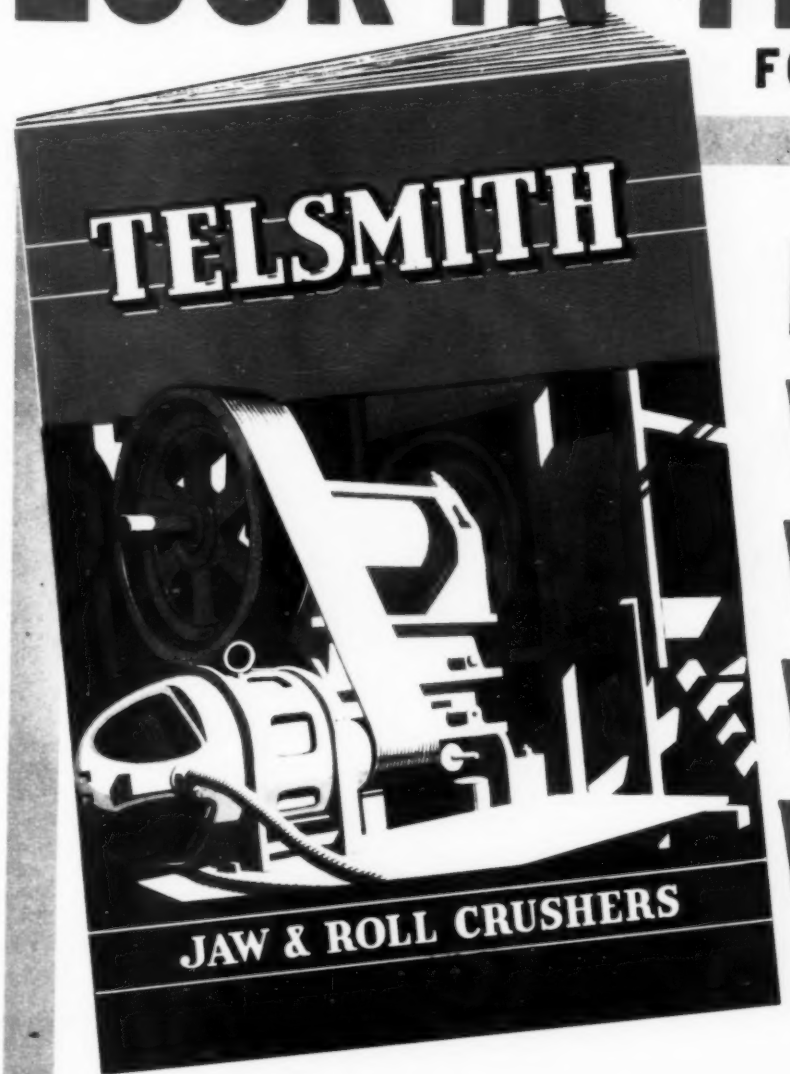


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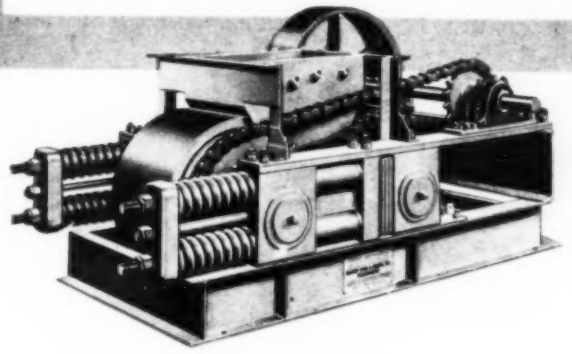

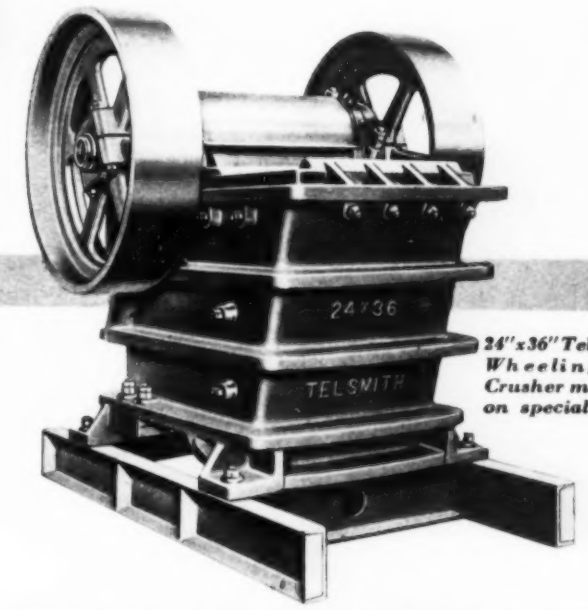


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**TELSMITH DOUBLE ROLL CRUSHERS** for large output of *fine aggregate* at reduction ratios not over 3:1. Less oversize than with any other type of secondary crusher. Compact structure saves headroom and weight. Anti-friction bearings and spring release give high-speed, continuous, trouble-free operation. Low first cost. *Get Bulletin JR-10.*

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JR-1-C

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Today BEACH saw rigs are known and used wherever there is wood to be cut. Engineering ability has developed for your use a line of equipment that is second to none.

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Our distributors have a balanced stock of saw rigs ready for your immediate needs. A request from you will bring full information and specifications.

**BEACH**
**MANUFACTURING COMPANY**
**Montrose**
**Pennsylvania**

*(Continued from page 84)*

grade, etc. and measuring for overbreak.

For S. S. Magoffin Co., Inc., contractor: F. R. Purvis, general superintendent; Frank Merrick, tunnel superintendent; Jake Brotzman, night superintendent; Grant McCullock, dam superintendent; J. Raski, track foreman; John Henry, master mechanic; Frank Johnson, electrician; Alber Olson, blacksmith; Frank Campbell, office manager.

Tunnel work is carried on with three shifts, of 8 hr. each per day, and one "crazy" shift; this fills in 160 hr. of the 168-hr. week, leaving 8 hr. on Sunday morning of idle time.

* * *

# Central Wood Mill

## Precuts Framing Lumber for Ft. Meade Army Camp

*(Continued from page 39)*

dure of using skilled men on any and all phases of their craft work, at the discretion of individual superintendents and assistant superintendents. Two considerations especially influenced the contractor against adoption of a step-by-step erection system: (1) Organizing such a system would almost inevitably entail some difficulties and delays at the start, and (2) interruptions and dislocations of the process would prove unavoidable on a vast, high-speed project which could not afford to place too much dependence on orderly, regularly scheduled deliveries of huge quantities of materials. Although the project is situated midway between the great cities of Baltimore and Washington, the contractor had difficulty in obtaining skilled labor in sufficient numbers. Radio broadcasting was used in an attempt to procure more skilled workmen.

### Building Design

All the cantonment buildings are set on concrete posts which carry the sills and columns. As indicated by the accompanying tabulation, the barracks, mess halls, recreation buildings and company storehouses made up 80 per cent of the total number of buildings included in the original contract. Barracks buildings are 29½ ft. by 80 ft., two stories high; each barracks accommodates a total of 63 men in open dormitories, plus partitioned rooms for the non-commissioned officers. Mess hall, storehouse and recreation buildings are 25 ft. 4 in. wide, one story high.

In the barracks buildings, the heater room and wash-and-toilet rooms are placed at one end of the building on a concrete slab laid directly on the ground. The heater flue goes to a chimney set some 4 ft. out from the side of the building; the chimney is brick in the lower part, surmounted by a steel smoke-pipe rising to above roof level. Coal-fired heaters with fan circula-

*(Continued on page 88)*

***How to handle tunnel construction on all sizes and types of project—with speed, economy, accuracy and safety—***

Speed up your tunnel-driving with accuracy and safety; avoid delays by beating tunneling problems before they occur; shave costs with efficient planning of operations as outlined in this practical, down-to-earth, test and reference manual for engineers and contractors.

Here is just the factual information you need on all phases of tunneling, arranged in compact handbook form. Covering each step in its logical sequence and with unusual thoroughness, the book brings you procedures, practices, methods, equipment and materials of modern tunnel construction.

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**PRACTICAL TUNNEL DRIVING**

*By* HAROLD W. RICHARDSON
Associate Editor, *Engineering News-Record*
*and* ROBERT S. MAYO
Construction Engineer

436 pages, 6 x 9, illustrated, $5.00

The practical information in this comprehensive book fully shows you how to construct tunnels of every size, shape, kind and class. It contains an abundance of details to guide you through each stage of the project—from initial planning to final completion—explaining *how* to carry out the various operations and *why* each step is taken as well.

What could be more logical and helpful than to have two widely experienced tunnel construction engineers set down, step by step, the most successful methods of getting work done? This book does exactly that! All the most valuable data, short cuts, kinks, facts, examples have been packed into this one convenient volume.

***Here is the kind of brasstack information the book contains:***

—how to design the tunnel
—how to sink the shaft
—how to insure accuracy in surveying work
—how to handle mechanical and hand mucking
—how to eliminate haulage bottlenecks
—how to tunnel soft ground with timber, with liner plates
—how to use the tunnel shield
—how to use drills for greatest effectiveness
—how to select, design, and place the lining.

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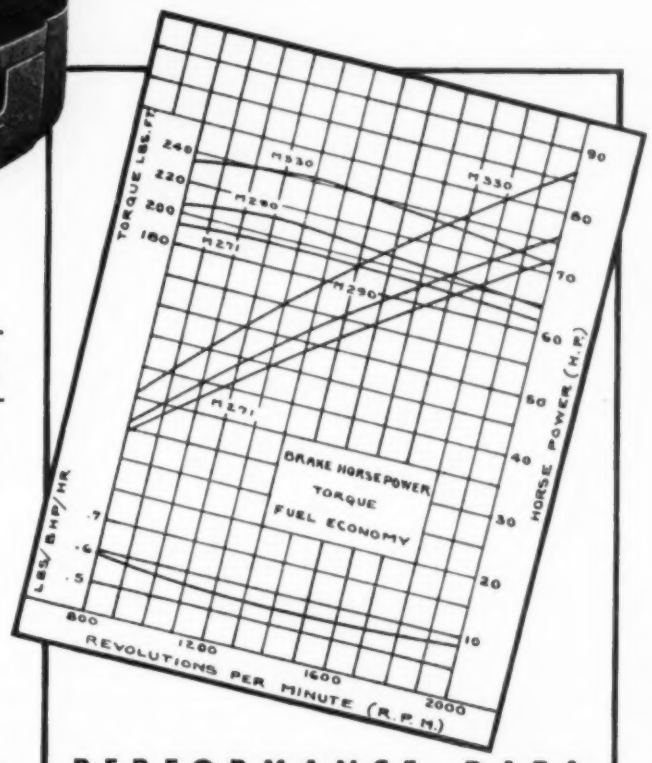
THESE popular sized Continental "M" engines and power units incorporate the latest refinements which have been proved in field service. Construction throughout is designed to prove maximum dependability and long serviceable life. Provision is made for all standard types of accessories. Provision for belt-driven air-compressor is on left hand side of engine.

The Red Seal line of industrial engines is complete, starting as low as 69 cubic inch displacement. Each size is engineered and built to give rugged, dependable, long-lived performance with low operating and maintenance cost.

## SPECIFICATIONS

| ENGINE MODEL<br>POWER UNIT MODEL | M-271<br>PM-271 | M-290<br>PM-290 | M-330<br>PM-330 |
|---|---|---|---|
| Bore and Stroke | 3⅝ x 4⅜ | 3¾ x 4⅜ | 4 x 4⅜ |
| Total cubic inch displacement | 270.93 | 289.93 | 329.86 |
| S.A.E. Horsepower rating | 31.54 | 33.75 | 38.40 |
| Engine R.P.M. at piston speed of 1000 feet per minute | 1371 | 1371 | 1371 |
| Approximate weight engine only (lbs.) | 800 | 810 | 820 |
| Approximate weight engine crated for LCL shipment (lbs.) | 945 | 955 | 965 |
| *Approximate weight closed power unit only (less clutch) (lbs.) | 1175 | 1185 | 1210 |
| Approximate weight closed power unit (less clutch) crated for LCL shipment (lbs.) | 1365 | 1375 | 1400 |

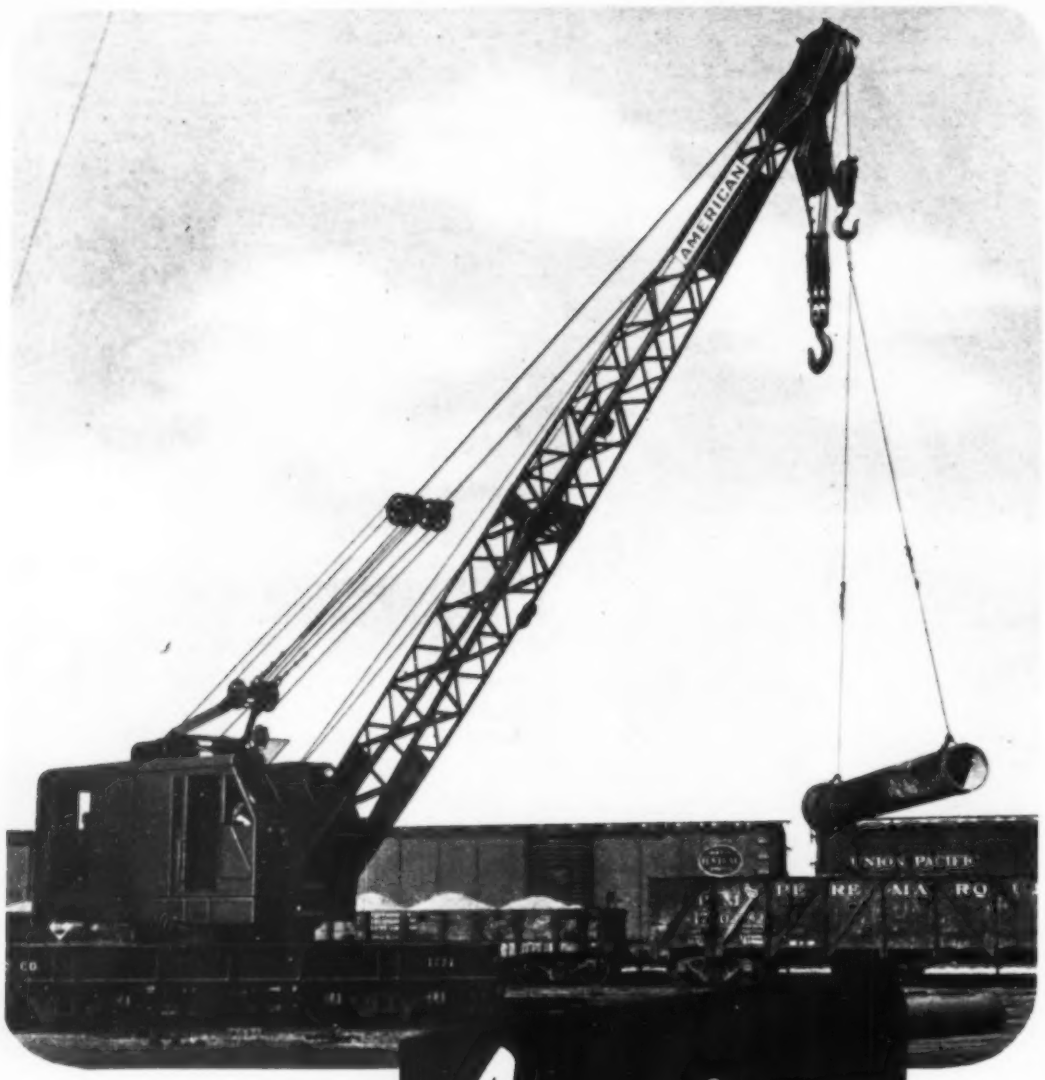
** Cast Iron radiator construction increases power unit weight approximately 120 lbs.*
** When sheet metal house and gasoline tank omitted deduct 165 lbs. from P.U. weight.*




## PERFORMANCE DATA

As shown is for "Bare" engines, (without accessories) on dynamometer, corrected to 29.92" of mercury (sea level barometer reading), and a temperature of 60° F. Obtain maximum load recommendation for constant duty operation by deducting 25% of power shown at engine speeds up to 1500 R.P.M. and 30% for higher speeds. These percentages provide for power absorbed by accessories and reserve for satisfactory operation at altitudes up to 3000 feet above sea level.

**Continental Motors Corp.**
MUSKEGON, MICHIGAN

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**ARE ABLE TO SHOW A CONSISTENTLY HIGH DAILY OUTPUT . .**

Large, outside contracting band clutches operated through AMERICAN graduated air controls permit smooth, almost effortless application of the frictions. Ease of operation prevents operator fatigue and explains the uniformly high output of the new AMERICAN Locomotive Cranes.

**FOUR MODELS 25 to 45 tons**

**AMERICAN HOIST & DERRICK CO.**
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*(Continued from page 86)*

tion distribute filtered, humidified air through overhead ducts equipped with regulating dampers on all laterals.

Barracks framing, which is typical, comprises sills of three 2x8's spiked together, interior posts spaced 10 ft. each way, 2x4-in. studs with 4x4-in. corner posts on 24-in. spacing, transverse floor joists (2x8 in. on 20-in. spacing for the first floor, 2x10 in. on 24-in. spacing for the second floor) and 2x6-in. rafters on 24-in. spacing for the roof, the rafters being supported by longitudinal beams of two 2x8's resting on the interior columns. Roof framing is tied transversely by 2x6-in. collar beams on 48-in. centers. Rafters project 3 ft. beyond the exterior wall of the building to form a rain shield for the upper story, and a rain hood of equal width is bracketed from the frame at the second floor level as a protection to the first-story windows.

For wall closure 1-in. wood sheathing, covered on the outside by building paper and 1x8-in. drop siding, was used in accordance with the plans. Roofs consist of mineral surfaced bituminous roll roofing on 1-in. sheathing. The interior of the roof is lined with gypsum board nailed to the rafters. Floors are 1x4-in. t. & g. straight-grain lumber laid on 1x8-in. t. & g. subfloor, with building paper between. Each barracks building has 36 double-sash windows (wood frame and wood sash), three smaller windows, six doors, and wood louvers in the end gables.

**CONTRACTOR'S JOB ORGANIZATION**
**Seven Construction Sections**

Sec. 1. Warehouses
Quartermaster regiment
Medical regiment

Sec. 2. First infantry brigade

Sec. 3. Second infantry brigade

Sec. 4. Engineer regiment
Special troops
Tank and anti-tank regiment

Sec. 5. Field artillery brigade

Sec. 6. Hospital group

Sec. 7. Miscellaneous detachments

### Lumber Yard

As a central storage and distribution point for the 40,000,000 b.-ft. of lumber required by the project the contractor located the job yard and wood mill on a railroad siding adjacent to a paved highway. Lumber is hauled by truck from this point to the various construction units on the project.

### Wood Mill

About 6,500,000 b.-ft. of framing lumber was scheduled for precutting to exact dimensions at the wood mill prior to delivery to the construction units. The wood mill is laid out with the four straight production lines, starting at one open end of the building facing the cars on the railroad siding. Lumber moves from the

cars into this end of the wood mill and, after being dimensioned by the power saws in the proper production lines, passes out the far end of the building directly to trucks for distribution on the project.

Eleven DeWalt electric-motor-driven variety (universal adjustment) saws are set up in the four production lines in the wood mill. The saws range from heavy-duty 5-hp. units for heavy ripping and notching to medium-weight 3-hp. machines assigned to cross-cutting operations only. Arranged in straight lines comprising two to four machines, depending upon the number of operations required for the various framing members, the saws are spaced at designed intervals ranging from 15 to 32 ft. and are connected by extension tables forming a continuous bench on each production line.

To fabricate roof rafters in four operations, the longest production line in the wood mill is equipped with four saws. The first two saws in the line make the square cuts at the two ends of the rafter, the third saw makes the center notch for the interior supporting beam, and the fourth machine daps the heel notch. This line also cuts the stair carriages for the project. Two 3-hp. saws are used for the cross-cutting, and two 5-hp. saws for the notching.

A second production line made up of one 3-hp. saw and two 5-hp. machines fabricates members requiring three operations. Among the members produced on this line are collar beams, notched studs, and two types of notched corner braces.

Each of the two remaining production lines is equipped with two power saws. One line, comprising a 3-hp. and a 5-hp. machine, cuts coal bin joists, coal bin rafters, notched girts and parts requiring dado. The final line utilizes two 3-hp. saws to cut canopy rafters, canopy braces, knee braces, shelf brackets, second floor platform braces (for the barracks buildings), platform rafters, and parts requiring two cutting operations.

In addition to the items noted, the wood mill also is used to precut other framing units such as studs, bridging and miscellaneous odds and ends.

**ARMY TRAINING CAMP**
**Fort George G. Meade, Md.**
*Buildings Included in Original Contract*
*Consolidated Engineering Co., Inc., Baltimore*

| | |
|---|---|
| 325 | 63-man barracks |
| 129 | 170-man mess halls |
| 145 | recreation buildings |
| 135 | company storehouses |
| 27 | officers' quarters |
| 11 | officers' mess |
| 16 | regimental administration buildings |
| 13 | guardhouses |
| 12 | post exchanges |
| 10 | infirmaries |
| 20 | motor repair shops |
| 20 | gasoline storage units |
| 13 | regimental warehouses |
| 1 | post office |
| 1 | telephone and telegraph building |
| 1 | radio station |
| 3 | fire stations |
| 1 | divisional administration building |
| 1 | service club |
| 2 | theaters |
| 1 | quartermaster utility shop |
| 17 | warehouses |
| 1 | incinerator |
| 1 | laundry |
| 1 | bakery |
| 1 | dental clinic |
| 908 | total buildings, original contract |
| 232 | buildings added later (including 67 in hospital group) |
| 1,140 | grand total buildings |

### Portable Power Saws

For miscellaneous cutting of concrete form lumber, scaffolding, sheathing, siding, and numerous other on-the-site operations during erection of the buildings, each of the seven construction sections on the project is equipped with four Beach portable table saws powered by LeRoi air-cooled gasoline engines.

### Administration

Under the direction first of Brig. Gen. C. D. Hartman, chief, construction division, Quartermaster Corps, U. S. Army, and later of Lt. Col. Brehon B. Somervell, who succeeded General Hartman as head of the division, all operations on the site at Fort George G. Meade, Md., are directed by Maj. James A. Noxon, Q.M.C., constructing quartermaster. For the Consolidated Engineering Co., Inc., Baltimore, general contractor, H. R. Dreher is project manager, and Robert C. Waldie is general superintendent. Representatives in charge at the site for the J. E. Greiner Co., Baltimore, engineers and architects, are E. Russell Allen, project engineer, and W. C. Roberts, assistant project engineer.

★ ★ ★

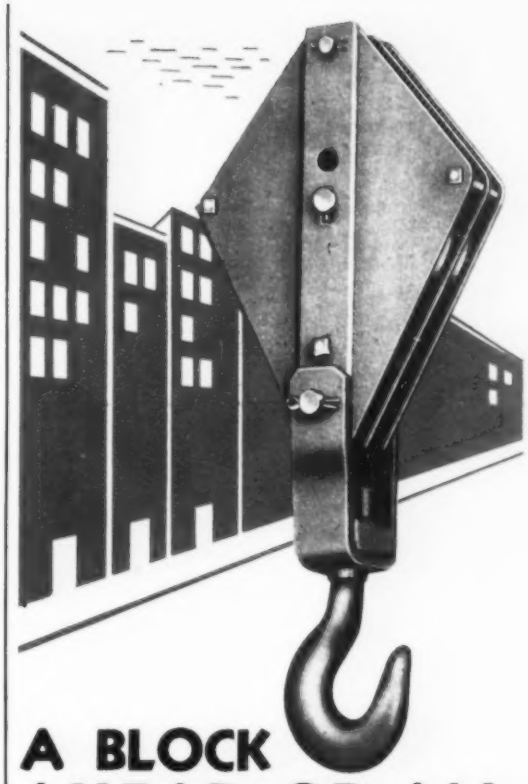
## Concrete and Asphalt Runways FOR NAVAL AIRPORT

*(Continued from page 49)*

38-ft. size as the dual-drum paving mixer.

An R.B. finegrader traveling on the forms (or on completed concrete lanes) cuts the subgrade to desired cross-section profile and deposits the excavated spoil outside the form line. The mixer, operating to one side of the lane being paved, is equipped with a long boom which enables it to deposit concrete across the 25-ft. width. To receive reinforcing mesh, the first course of concrete is struck off 2 in. below finished grade by a Jaeger-Lakewood two-screed finisher fitted with an adjustable strike-off plate on the forward

*(Continued on page 90)*

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**are thoroughly engineered — and their superior finish is proverbial.**

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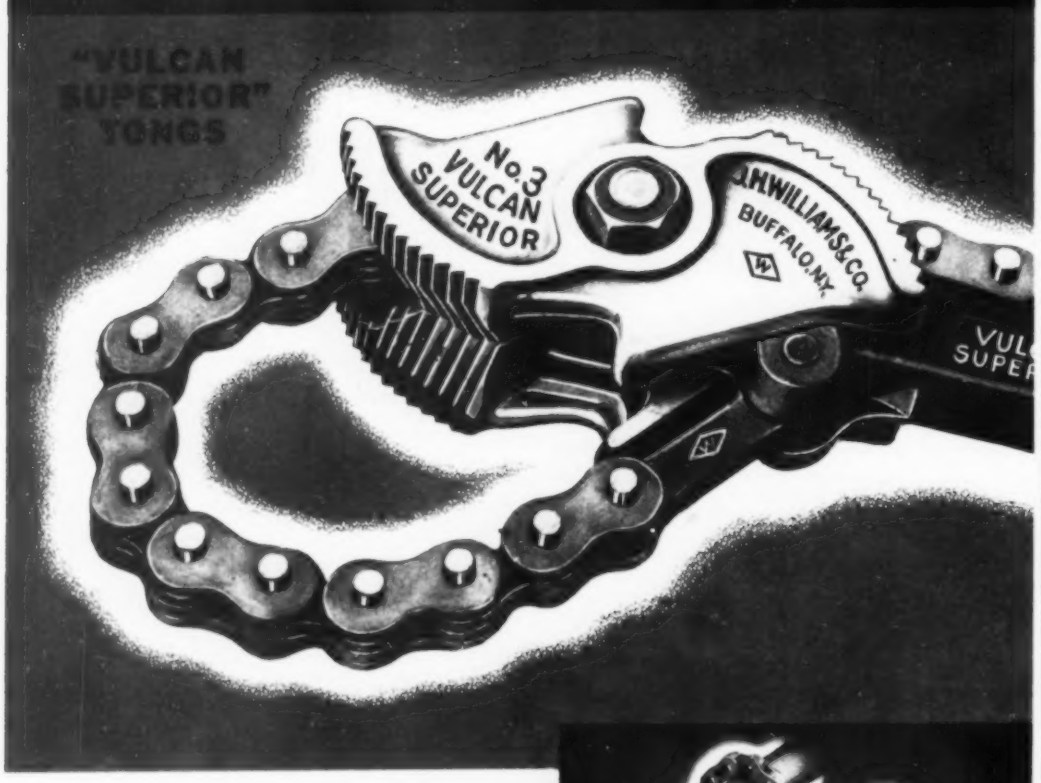
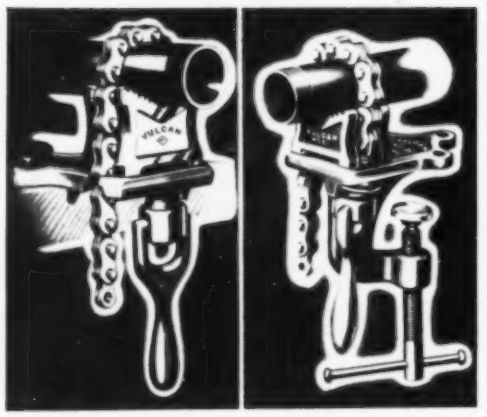
# PIPE TOOLS THAT PAY



"VULCAN SUPERIOR" VISES



GENUINE "VULCAN" VISE — "VULCAN" CLAMP KIT VISE

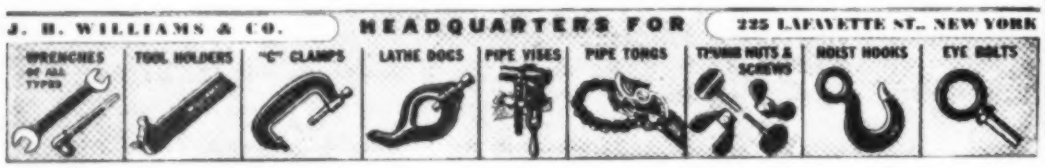
Reversible Pipe-and-Fittings Jaws make "Vulcan Superior" a universal service tong . . . actually TWO tools in one. It handles BOTH pipe or fittings with amazing ease — you can switch from one to the other instantly — no parts to change — no adjustments to make. The "V" recess in the jaws assures quick, positive grip on all fittings. 7 sizes, with either Flat or Cable Chain for pipe and fittings, 1/8 to 12 inches.

And 3 dependable vises. *"Vulcan Superior"* with adjusting handle on top and jaws reversible for double service life. Made in 2 sizes for pipe, 1/8 to 4½ inches.

*"Vulcan"*, the *original* chain pipe vise — small, compact, positive in grip. Made in 4 sizes for pipe, 1/8 to 8 inches.

*"Vulcan" Clamp Kit Vise* — easily carried — clamps anywhere. Weighs only 5¾ lbs. For pipe, 1/8 to 2 inches.

*Investigate these time-saving pipe tools. Sold by industrial distributors everywhere. Literature on request.*





*(Continued from page 89)*

screed. After reinforcing mesh has been placed on this layer of concrete, the mixer returns to place the top course, which is struck off and finished by the two-screed machine in the normal way. Contraction-joint filler strips for both longitudinal and transverse contraction joints are installed by means of a self-propelled Flex-Plane machine riding on the form rails. As soon as the finishers have completed their work, the concrete is covered with reinforced waterproof Sisalkraft paper, which remains in place 72 hr.

At the railroad batching plant, a Lorain 2-yd. diesel clamshell crane and a Northwest 1¼-yd. gasoline crane unloaded sand and gravel out of gondola cars into stockpiles or into the 45-ton bin of a Blaw-Knox weigh-batch unit. Trucks backed under the batcher to load. Bulk cement was unloaded and batched by a Heltzel trackside plant with a capacity of 30 tons an hour.

Operating during the daylight hours of the fall days, the double-drum paver placed an average of about 4,000 sq.yd. in 10 hr. With the addition of the 34E single-drum mixer, the rate of production was expected to increase more than 50 per cent.

A relatively small area of the runway paving is to be placed on hydraulic fill pumped in during the fall. The dredged material is of poor quality, and the fill is being allowed to settle over the winter before a final decision is made on the design of pavement to be constructed on this area.

During the first stages of the high-speed project at the air station, the engineers in charge for the Bureau of Yards and Docks of the Navy Department made studies of the possibility of using a soil base processed with portland cement and covered by a wearing mat. Because the cost differential in favor of this construction appeared to be small, a decision was made to build rigid reinforced-concrete slab, for which the subgrade provides ample support.

### Asphalt Runways

An altogether different set of conditions faced the Bureau of Yards and Docks in designing runways for Turner Field at the Quantico Marine Base. A mud fill up to 40 ft. deep had been pumped into the area 6 or 7 years ago, and the airfield had to be constructed on this unstable foundation. Under an earlier contract completed in 1939, the entire field was covered with about 2 ft. of dry earth fill from hillside borrow. The Atlantic Bitulithic Co. stabilized the major portion of the area by processing the top 5½ in. with asphalt emulsion, mixed in at a rate of about 3 gal. per square yard with about 25 per cent by volume of sand-gravel admixture.

As laid out, the field comprises a paved circle with two 200-ft.-wide runways intersecting at the center of the circle. The asphalt emulsion processing included all parts of the area except the main runway, and the foundation of this runway was reinforced with special gravel sub-base as part of the paving contract. Soil processing at first appeared to add insufficient stability to the top 5½-in. of the earth blanket, as the material remained soft and spongy

*(Continued on page 92)*

# TO SPEED-UP DEFENSE CONSTRUCTION

Among many major government projects in which hundreds of tons of calcium chloride have been used are the Grand Coulee and Bartlett Dams. Photo here taken at Bartlett Dam by the U.S. Bureau of Reclamation and reproduced through its courtesy.

***Write for Brief 155 and for Specifications and Data on Use.***

## USE CALCIUM CHLORIDE IN COLD WEATHER CONCRETING

Why lose days and weeks waiting for slow winter concrete to gain safe strength. Get the fast action of normal 70° summer placement temperatures into your concrete mix with calcium chloride. Calcium chloride produces safe strength in half the time, permits succeeding placements to go forward, releases forms, gets concrete ready for finishing, cuts days out of winter concrete schedules. 25 years of field use and long research tests by the National Bureau of Standards and other authoritative bodies show that the addition of calcium chloride gives concrete better strength at all ages. It is ideal to speed work in housing projects, pavements, fortifications, factory building and the numerous major construction projects required by the defense program.

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**YEAR 'ROUND CONCRETE CONSTRUCTION**

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PILING SCHEDULES
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• Dependable, high-load bearing, cast-in-place concrete piles can be installed in less time with Monotubes. These cold rolled, tapered steel casings handle faster because they are light weight—drive faster because they require no core or mandrel. No special driving equipment required—just a crawler crane, standard leads and hammer. Every casing can be inspected from top to toe for plumbness and soundness before filling with concrete. Monotubes are available in various gauges, tapers and extensions to meet all soil conditions.

Make your piling problems our problems. Our experienced foundation engineers are at your service. Write for copy of Catalog No. 68A.

THE UNION METAL MANUFACTURING CO.
CANTON, OHIO

*(Continued from page 90)*

during the fall of 1939. To remedy this condition, the processed material was thoroughly aerated by disk harrows and cultivators in the spring. After being reworked in this way and recompacted, the material became quite firm and stable, furnishing a satisfactory subgrade for bituminous paving.

A paving contract including unit prices was awarded to the Atlantic Bitulithic Co. as the lowest bidder. The contract originally called for 43,500 tons of asphaltic concrete, but this tonnage was almost doubled by later additions during the course of the work. In all, the contractor paved about 500,000 sq.yd., of which 85,000 sq.yd. is included in a parking area and taxi strip for planes.

### Pavement Types

For the main runway, built up on unstabilized earth blanket, a 3-in. compacted gravel sub-base was first constructed with material hauled in to the site. On this compacted layer, the contractor placed a 5-in. base of hot-mixed hot-laid asphaltic concrete made up of bank-run sand-gravel aggregate and 5 per cent asphalt, 85-100 penetration. Material for a 2-in. top course, laid on the base, consisted of crushed and screened gravel with 7 per cent asphalt of the same 85-100 penetration.

Bank-run aggregate for the base mix was classified at the two asphalt plants by screens which rejected sizes larger than 1½ in. Graded aggregate brought in by barges for the top course contained nothing larger than ¾ in. Specifications for the surface mix required 4 to 7 per cent fines passing the 200 mesh. In base mix, 0 to 8 per cent passing 200 mesh was allowed, and the average was about 2.5 per cent.

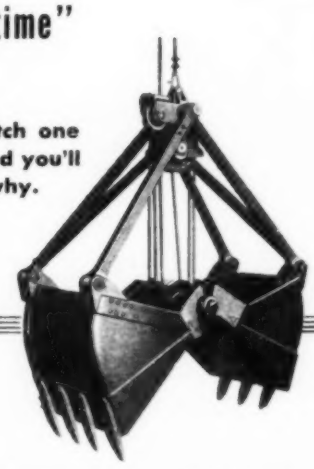
For the shorter runway, laid on stabilized soil, the same base and top mixes were used in constructing a 4-in. base course and a 2-in. wearing course. Two taxiways serving the field likewise followed this design, providing a pavement of 6-in. total depth. Quadrants of the circle were paved between runways with 2½-in. of hot-mixed material containing bank-run sand-gravel and 5 per cent asphalt, 85-100 penetration. In the parking area for planes, a 3-in. surface of this material was placed on a 6-in. clay-gravel stabilized base.

### Daily Production

Two Warren Bros. asphalt plants mixed the asphaltic concrete, a large electrically powered unit producing 3,000-lb. batches and a small steam-driven plant turning out 1,000-lb. batches. Up to the middle of September the plants worked two or three 8-hr. shifts per day and attained a maximum daily output of 1,500 tons. The working day then was reduced to two shifts, 16 hr., in which the plants produced a maximum of 1,000 tons. All the asphaltic concrete was laid in courses of maximum 3-in. thickness by a Barber-Greene tamping-leveling finisher. Rolling by a 10-ton and a 5-ton roller was carefully controlled, as required by the fact, discovered early in the job, that too much rolling had a tendency to bring water from the high

"For my money—I'll take an Industrial Brownhoist Bucket every time"

Just watch one work and you'll see why.



Industrial Brownhoist Clamshells are built in Rope Reeve, Power Wheel, Lever Arm and Link Types. Capacities range from ½ to 15 yards. Booklet 353, containing complete facts, is yours for the asking.

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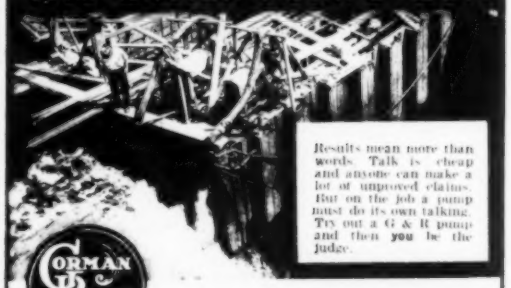
THE OTHER PUMPS QUIT


Results mean more than words. Talk is cheap and anyone can make a lot of unproved claims. But on the job a pump must do its own talking. Try out a G & R pump and then you be the judge.

GORMAN & RUPP PUMPS

AGAIN THE CONTRACTORS BOUGHT GORMAN-RUPP

On the new Shore Parkway project at Brooklyn two centrifugal pumps one an 8-inch and the other a 4-inch, clogged and quit. Two "Can't Clog" G & R 6-inch pumps replaced the quitters and for weeks pumped 24 hours per day.

Gorman-Rupp Pumps Can't Clog. They are not quitters. That's why MORE CONTRACTORS ARE STANDARDIZING ON GORMAN-RUPP PUMPS THAN ANY OTHER MAKE. They will pump MORE WATER and pump MORE HOURS at LESS COST.

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THE GORMAN-RUPP CO., Mansfield, Ohio

groundwater table up through the hot asphalt mixtures. It is planned to seal all the pavement next spring with a light surface treatment consisting of .10 to .15 gal. per square yard of hot asphalt and heated sand broomed into the voids.

### Direction

Work at the Norfolk Naval Air Station is under the direction of Comdr. G. D. Wetsel, C.E.C., U.S.N., officer in charge for the Bureau of Yards and Docks of the Navy Department. H. D. Hinman, president, Virginia Engineering Co., Inc., Newport News, Va., is project manager of the entire contract, and C. W. Lambert is superintendent responsible for paving. To assist in directing the paving operations the general contractor engaged W. H. Scott, an experienced highway contractor, of Franklin, Va. A number of units from Mr. Scott's modern paving plant have been rented for use on the project.

At Quantico, the public works officer in general charge for the Navy is Comdr. W. O. Hiltabidle, C.E.C., U.S.N. George F. Robinson is superintendent for the Atlantic Bitulithic Co., Washington, D. C., paving contractor.

* * *

## Brick Surface on Concrete Base FOR DETROIT STREET WIDENING

*(Continued from page 54)*

came on the job to rebuild and replace underground and overhead facilities. This work, made necessary by the widening, was performed in accordance with terms of an agreement prohibiting for a period of 25 years pavement cuts for repairs except in cases of extreme emergencies. To avoid pavement cuts, underground mains, ducts and surface pipes in most cases were located in the sidewalk area. Plans for the 0.878-mi. section of Michigan Avenue from Fifth to Fifteenth Street were adopted by the Detroit Common Council on April 16, 1940, and the Weir Construction Co. started work on the project May 31.

### Track Incasement

As soon as the utility workers were out of the way, the contractor began filling open basement areas with a selected sand material. While this operation was in progress, other crews removed old pavement to prepare the area for new car track incasement; construction of the track incasement thus was able to proceed as soon as the basements had been backfilled.

An accompanying half-section drawing illustrates features of the track incasement and of the pavement. The track incasement

*(Continued on page 94)*


GIVE ME A DUFF-NORTON JACK *Every Time!*

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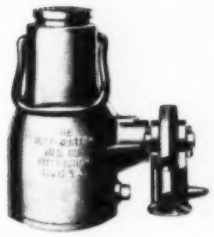
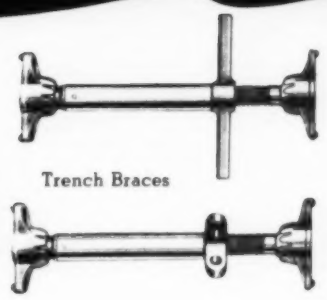
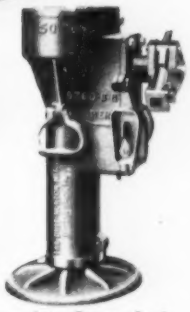

Journal Jack for low-set loads


Trench Braces


Heavy-duty Screw Jack

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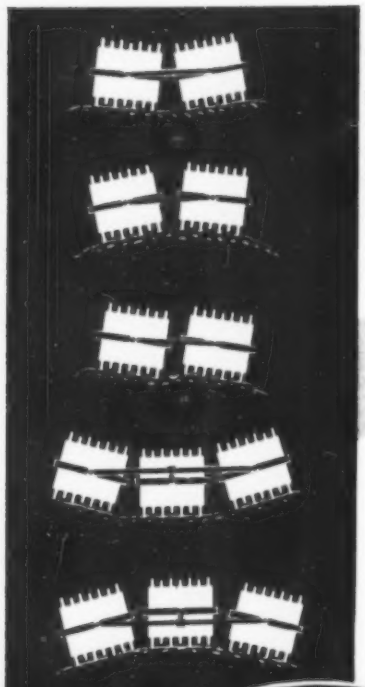

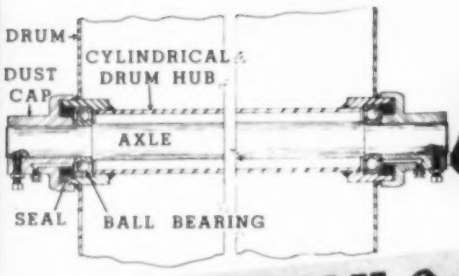


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TAMPING ROLLERS

- Illustrated above is the *through drum shaft —with sealed bearings*, an exclusive feature which means better performance and longer life from Blaw-Knox TAMPING ROLLERS.

Blaw-Knox pioneered the Tamping Roller for compacting earth fills—introduced the *double acting spring hitch* to absorb shocks, the feature of *easily renewable tamping feet.*

Blaw-Knox Tamping Rollers are designed interchangeably so that they can be used single, double, three abreast, double roller in front and single roller behind, etc. They are sturdily built for long life under hard service conditions.

The roller drums are free to oscillate to conform to all ground contours

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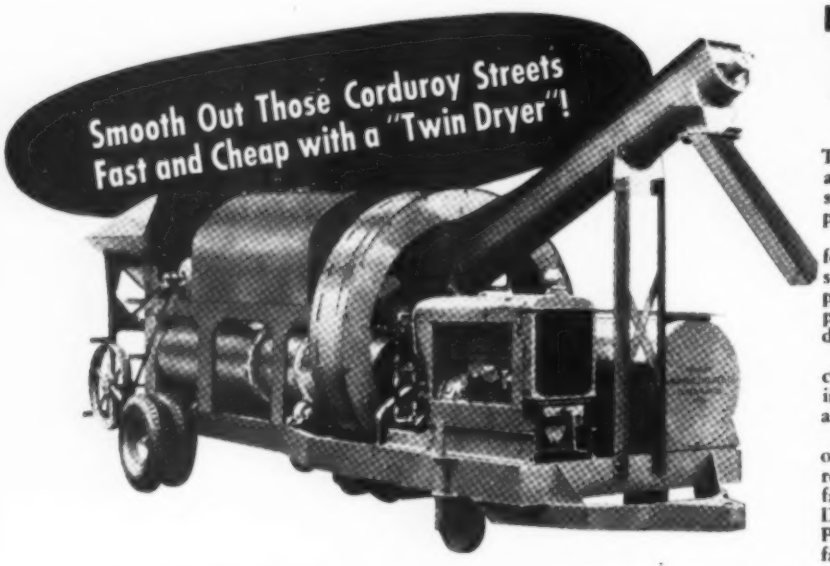
BLAW-KNOX BINS AND BATCHERS • ROAD FORMS • STREET FORMS • CONCRETE SPREADERS • TAMPING ROLLERS • VIBRATORS
CONCRETE BUCKETS • CLAMSHELL BUCKETS • TRUCK MIXERS • STRIPING MACHINES • TURNTABLES • ROAD FINISHERS • STEEL FORMS



Smooth Out Those Corduroy Streets Fast and Cheap with a "Twin Dryer"!



**How the UNIVERSAL "TWIN DRYER" ASPHALT PLANT WORKS:**

This new fast, flexible, portable asphalt plant is a "life saver" for city street departments.

It makes asphalt mixtures for surfacing residential streets, concrete road approaches, parking lots, airports and for quickly widening other pavements.

It's the most practical machine ever built for producing low cost maintenance and hot patching materials.

You keep the goodwill of citizens and make street repair dollars go twice as far with a Universal "Twin Dryer" Portable Asphalt Plant. Get the cost-cutting facts—write today!

**Sand and aggregates from a gravel plant conveyor, trucks or bins are fed into a twin hopper with manually controlled regulator which discharges into oil-fired twin dryers—sand to one dryer and aggregates to the other. Dried material is elevated by Rotavator to a Screw Pug Mill where hot oil is added. Oil tank is heated by waste heat from dryers. The asphalt mix is thoroughly cut and kneaded on its way to the swivel discharge chute. Material loads into trucks. Operation is fast, simple, thorough. Capacity up to 42 tons of finished material per hour. Construction is rugged. Easily moved over streets and roads from pit to pit or barn.**

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UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS


*(Continued from page 93)*

consists of 15½ in. maximum depth of grade A concrete (1.375 bbl. cement per cubic yard) placed in two courses over a 4-in. rolled slag base, as illustrated by accompanying photographs. Some of these photographs were taken on Gratiot Ave., which was being widened at the same time that work was in progress on Michigan Ave., but the method and equipment used for actual track incasement were exactly the same for both projects. The upper course of concrete, placed with the aid of track vibrators, incases 120-lb. flanged rail with steel ties.

After being struck off with special screeds, the surface of the concrete was grooved to eliminate creeping of the asphalt surface. To provide an elastic surface which would not deteriorate as a result of the vibrations of street car traffic, it was considered desirable to place 1½-in. bituminous binder course and 1½-in. sheet asphalt surface in the area inclosed between the outer rails of the two tracks.

### Reinforced-Concrete Base

Concrete for track incasement was placed between steel forms set 18 ft. apart, making it possible to use a finishing machine to strike off the first course. In the 36-ft. width between the track incasement and the curb, the finishing machine likewise was used in placing two 18-ft. strips of Grade B concrete (1.25 bbl. cement per cubic yard) for reinforced-concrete base of 10-in. uniform thickness with a thickened edge of 14 in. adjacent to the car track area; the base was reinforced throughout and the two strips were tied together with dowel bars. Concrete was vibrated along the form lines to assure a dense mixture free from voids and honeycomb adjacent to the form. Plane-of-weakness joints were placed about 30 ft. apart by inserting premolded bituminous filler strip to a depth of 2½ in. below the top of the base course.

Scoring of the concrete surface was not required on base for brick pavement outside of the car track area. The concrete surface was straight-edged to a tolerance not exceeding ⅛ in. in 10 ft. All drainage castings and manhole covers were set to proper elevation by the use of a level to assure smooth riding qualities. Following initial curing under wet burlap, the surface of the concrete base was covered with asphalt emulsion applied in a continuous uniform film by a pressure spray at the rate of 1/10 gal. per square yard.

### Brick Surface Construction

After the base had attained a modulus of rupture of 500 lb. per square inch a layer of mastic cushion was spread to a uniform thickness of ½ in. to provide the bedding course for the brick. The mastic contained 5 per cent MC-1A bituminous material mixed with sand meeting the following gradation requirements:

| | Per Cent Passing |
|---|---|
| No. 6 sieve | 100 |
| No. 10 sieve | 60-90 |
| No. 100 sieve | 0-5 |

To fill the void directly underneath the

*(Continued on page 96)*

**3 W**
3-yard bucket on 90 foot boom. Other front-end combinations on request.

**5 W**
5-yard bucket on 100 foot boom. Other combinations on request.

OVER
# A Billion YARDS
of experience built into these machines . . . . There is a field-proven size for every walking dragline job . . . .

BUCYRUS MONIGHAN

**15 W**
14-yard bucket on 188 foot boom. Other combinations available.

**9 W**
10-yard bucket on 160 foot boom. Other combinations available.

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Every unit of ARMCO Sheeting on this large sewer project was driven at least 35 times. Yet all are in good condition and ready for additional service.

● Many contractors and engineers know from experience that ARMCO Sheeting has what it takes for repeat performances. It is readily pulled and can be used again and again.

Naturally this high salvage value means low material costs on trenches, cofferdams, foundations and similar works. You need less sheeting for big jobs. On smaller projects you save by moving ARMCO Sheeting from job to job, thus eliminating the expense of new material. Between jobs the nestable units take up little storage space.

ARMCO Sheeting helps speed the job too. It drives fast to full penetration, thanks to a comparatively small displacement area. The corrugated metal design combines safe strength with light weight for easy handling.

There is a gage and type of ARMCO Sheeting to meet every requirement. Write us for complete information regarding its practical application to your specific jobs. ARMCO DRAINAGE PRODUCTS ASSOCIATION, 5013 Curtis Street, Middletown, O.

ARMCO SHEETING


*(Continued from page 94)*

street car rail flange, a special track mastic was made up in the following proportions:

| | PER CENT |
|---|---|
| Mastic cushion sand | 78 |
| Filler (80 per cent passing No. 200 sieve) | 15 |
| Bituminous material MC-1A | 7 |

Tamped into place and troweled, this special mastic proved entirely satisfactory for filling the space between the brick and the rail flange. Laying of the brick surface followed within 50 ft. of the placing of the mastic cushion.

On the ½-in. sand-mastic cushion, the contractor laid 3-in.-thick de-aired vertical fiber wire-cut lug vitrified brick at right angles to the curb and to four stretcher courses placed parallel with and adjacent to the outside rails of the car tracks. The specified size of brick was 3x4x 8½ in., and individual bricks were not permitted to vary from this nominal size by more than ⅛ in. in width or depth, nor more than ¼ in. in length. Joints were broken at the stretcher course and curb line with half bricks not less than 3 in. in length. Specifications required that each course vary not more than 1 in. in 50 ft. from a true line. Close behind the brick droppers, a 5-ton roller bedded the brick in the mastic cushion; after this rolling, all unsound and broken bricks were removed and replaced. A 10-ft. straight-edge was used to test the brick surface, and corrections were made at once.

### Joint Filler

For a distance of 10 to 25 ft. in advance of application of the asphalt joint filler, the surface of the brick was treated with a separating agent consisting of a solution of 100 lb. of calcium chloride, 3 lb. of starch, and 25 gal. of water, applied with an air-pressure spray. The amount applied depended upon the temperature and the absorption of the brick, but application was controlled to prevent any of the separating agent from getting into the joints.

Asphalt filler, heated in two 500-gal. kettles to a temperature between 400 and 500 deg.F., was applied by pouring directly over the brick from buckets. Excess filler remaining on the surface was removed by cutting it off in strips two bricks wide with scraping tools. Special care was taken not to loosen or pull the asphalt from the joints. After excess material had been removed by scraping, all unfilled joints were refilled flush with a small hand bucket. Salvaged asphalt was not permitted to lie on the brick but was allowed to be reheated and re-used when it did not exceed 40 per cent of the total.

### Special Provisions

A provision of the construction schedule incorporated in the original proposal called for access to Briggs Stadium, the Detroit baseball park, located near the center of the project, during all home games. This requirement was fulfilled by the contractors in the regular order of construction, but an unanticipated world series between Detroit and Cincinnati caused a complete change in the original plan and necessi-


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Although a Homelite Generator weighs only 82 pounds, complete with built-in gasoline engine, it has a power output of 1800 watts. You can hitch up several tools at a time—drills, saws, concrete surfacers, vibrators—and run them all as much as you want. Several power outlets plus the Homelite terrific punch make this possible.

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Being easily portable—a unit that one man can carry and set up instantly right where you want power —a Homelite does away with the necessity of installing electric power. Delays are thereby eliminated. *And costs.* Moreover you're not being troubled by long hazardous cables running all over the job.

*Send for bulletin.*

HOMELITE CORPORATION

1802 Riverdale Avenue, Port Chester, N. Y.

tated a 24-hr. working schedule to complete portions adjacent to the ball park in preparation for the large crowds attending the series games. Detroit's baseball fans got to the games but were somewhat disappointed in the outcome of the series.

### Property Improvements

New fronts on the remaining portions of buildings on the widened side of Michigan Ave. and alterations of structures on the other side are notable features of a remodeling program undertaken by property owners throughout the length of the project. Newly constructed and modernized stores, in conjunction with the increased street width and additional parking facilities, have improved the volume of business to a degree that offsets any temporary inconvenience and loss of income during construction of the project.

* * *

## *Speed With Safety*

## MARKS "EL" RAZING

*(Continued from page 42)*

was 80 working days. To meet the contract date, this time called for removal of an average of 2½ blocks, or 700 tons of steel frame, each working day, and the job was manned and equipped to maintain better than this minimum required rate of progress.

During the first 7 weeks, the bulk of the equipment and manpower was concentrated on the 3½-mi. midtown section to remove elevated structure and stations down to the masonry piers of the columns below street level. As this section approached completion, the stripping and wrecking crews were dispersed to three other sections into which the remainder of the job was divided. Each section, 40 to 45 blocks long, was attacked at two points by stripping crews followed by wrecking crews, making a total of six stripping outfits and six wrecking outfits at work. Three street gangs equipped with air compressors, paving breakers and oxyacetylene torches, dug out the pavement around the column bases and burned the nuts off the anchor bolts. A single column crew with one crane pulled and loaded the column stubs left standing in the street.

In essence, the organization conformed to the pattern outlined above. Actually it was extremely flexible, as the nature of the work demanded, and cranes and crews were shifted from section to section and from one operation to another when required. The payroll averaged about 500 and reached a maximum of 600.

### Cranes and Cutting Torches

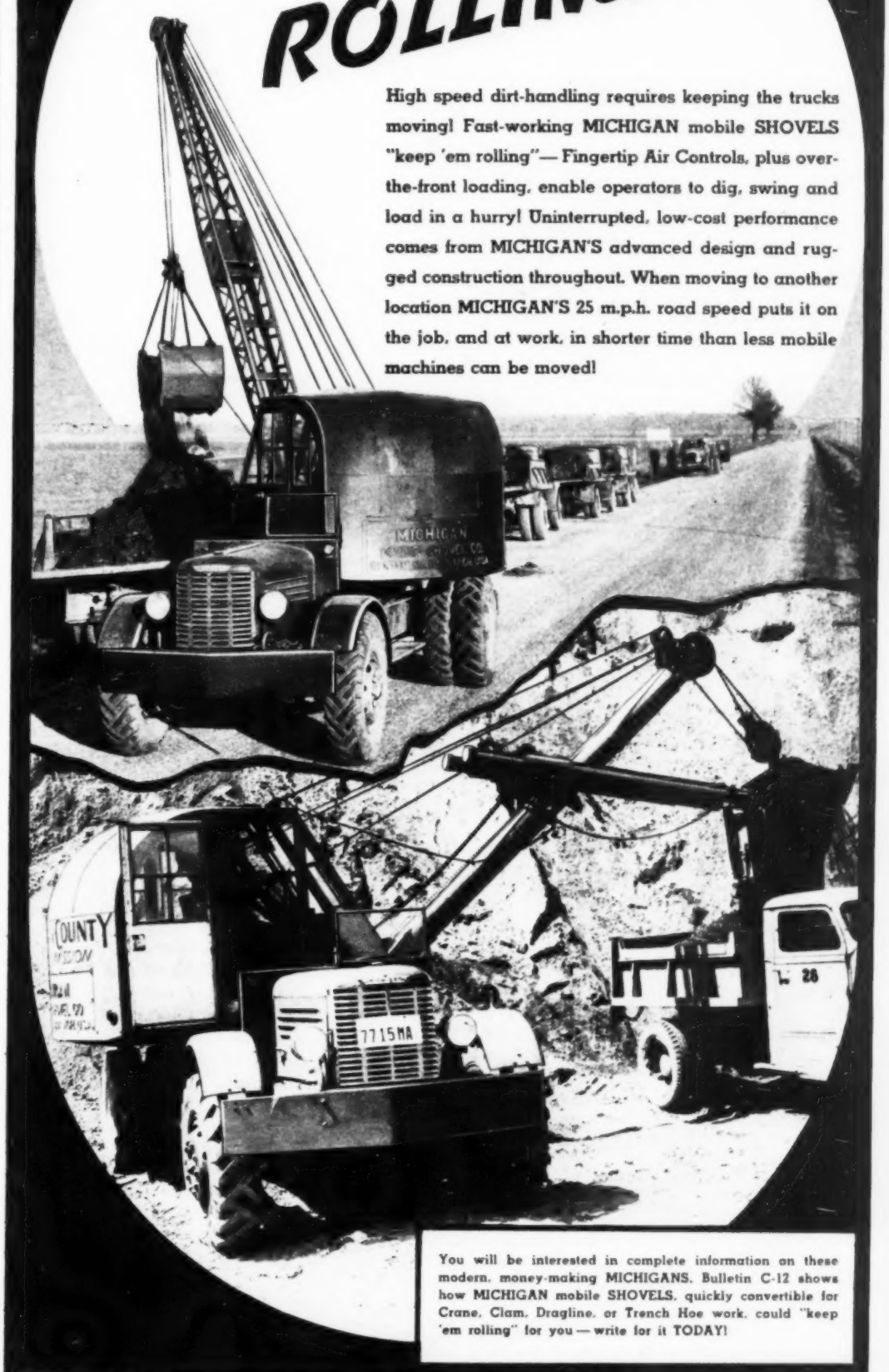
Wrecking cranes loading dismembered steel were heavy crawler-mounted units which traveled in the street except at one

*(Continued on page 98)*


MICHIGANS

Keep 'em ROLLING!

High speed dirt-handling requires keeping the trucks moving! Fast-working MICHIGAN mobile SHOVELS "keep 'em rolling"— Fingertip Air Controls, plus over-the-front loading, enable operators to dig, swing and load in a hurry! Uninterrupted, low-cost performance comes from MICHIGAN'S advanced design and rugged construction throughout. When moving to another location MICHIGAN'S 25 m.p.h. road speed puts it on the job, and at work, in shorter time than less mobile machines can be moved!

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BENTON HARBOR MICHIGAN

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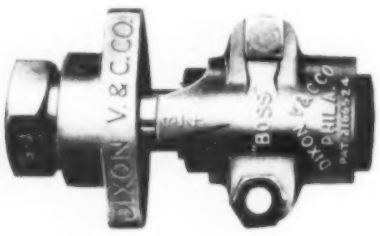
WHEN YOU PUT THESE TOUGH, TIGHT-GRIPPING COUPLINGS IN SERVICE!

## "DIXON"

AIR HAMMER COUPLING

These durable, dependable couplings fit and grip the hose ends *so tightly* that leaks and pressure losses are eliminated, and the drill, hammer or spade is allowed to operate at maximum efficiency, *at the lowest possible cost.* Easy to install and built to give far better service than their low price would indicate. Cadmium plated—rustproof. Compact Type, Style WLD-7, ½" and ¾". Heavy Type, Style WHD-9, ¾" and 1".

NOTE: For *washerless* couplings of same type, specify "GJ-DIXON" Ground Joint Air Hammer Couplings—Compact Type, Style XLD-41, ½" and ¾". Heavy Type, Style XHD-52, ¾" and 1".




## "BOSS"

AIR HAMMER COUPLING

Same as "DIXON" Air Hammer Coupling described above, except that it is furnished with sturdy malleable iron "BOSS" Clamp for extra strength and gripping power. Application of this clamp, with extended fingers to engage collar on steel stem of coupling, insures the tightest possible grip on the hose and virtually eliminates all risk of leaks, pressure losses and blow-offs. Cadmium plated—rustproof. Compact Type, Style WHB-21, ½" and ¾". Heavy Type, Style WHB-32, ¾" and 1".

NOTE: For *washerless* couplings of same type, specify "GJ-BOSS" Ground Joint Air Hammer Couplings—Compact Type, Style XLB-61, ½" and ¾". Heavy Type, Style XHB-72, ¾" and 1".

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*(Continued from page 97)*

location, 110th St., where the elevated structure on so-called Suicide Curve rose over store buildings to a height of 60 ft. above the ground at a maximum horizontal distance of 90 ft. from the nearest curb. To dismantle the steel frame at this point the contractor put on the deck a crawler crane weighing 35 tons, equal to the weight of a loaded El car. The crane ascended to the deck by means of a ramp at 105th St., where the height was a normal 18 ft. above the pavement. Timber pontoons were used under the crane to spread the load on the steel structure.

To strip track and deck structure ahead of the wrecking outfits, the contractor used both truck cranes and crawler cranes. Wherever street width permitted, these units worked on the pavement alongside

**STREET GANG** chips out pavement around column base with pneumatic paving breakers to expose anchor bolts from which nuts will be cut by burner. Gang will then backfill hole with sand and will leave column stub standing to be removed by crane operating with column crew.

the structure, but in narrow streets where El columns were set inside the curb line the stripping crews utilized truck cranes operating on timber mats on the deck. One truck crane went up the ramp at 105th St. and stripped the deck in Eighth Ave. from 110th to 128th St. Two others, set on top by heavy crawler cranes, cleared the deck in Greenwich St. from Battery Place to Bank St., a distance of 40 blocks.

A typical battery of cranes operating at one time on the project included two 37-ton-capacity Limas, two Marions of equal capacity, two 20-ton Manitowocs (one of which worked on top of the structure in 110th St.), two Northwest crawlers, two Lima truck cranes on rebuilt Mack chassis traveling on the deck, one Northwest truck crane working on the structure, and one P&H truck crane working in the street.

Five burners worked with each of the six heavy wrecking cranes. Three burners operated ahead of the crane, and two stayed with the machine to do the final

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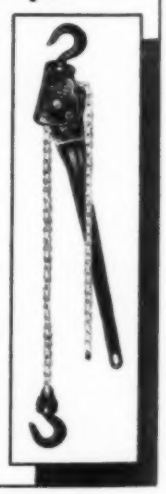
***when they're on the job . . .***

Here's a one-man tool that can do a hundred and one jobs on any construction project. One man and a Coffing Safety-Pull can lift, pull, move, and do many emergency and repair jobs. Then there are the big jobs where batteries can be set up such as shown in illustration. Here are 7 Model F Safety-Pulls lifting forms on the Marshall-Ford Dam in Texas. When used in batteries they exert powerful uniform action that makes them invaluable for many kinds of construction work. Let us send you circulars telling all about Coffing Safety-Pull Hoists — their safety features—their efficiency—their easy portability—their low first cost.



**COFFING HOIST COMPANY**
**DANVILLE ILLINOIS**

burning after the rig had taken a strain on the slings supporting the member to be severed. The job employed a total of about 40 burners. Although a No. 3 cutting torch was technically adequate for the work, the burners were supplied with No. 4 tips (Airco, Craftsweld and K-G) for speed on heavy cutting of badly scaled steel.

Acetylene cylinders averaged about 250-cu.ft. gas content, and the burners were able to make use of about 200 cu.ft. through the long hoses. On heavy cutting, a burner in one day would consume 200 cu.ft. of acetylene and about 1,000 cu.ft. of oxygen. Some burners got along on four bottles of oxygen (880 cu.ft.), but a greater number used five bottles (1,100 cu. ft.). Burners employed in removing hook bolts that anchored the track to the girder flanges used 100 to 125 cu.ft. of acetylene per day, with two or three bottles of oxygen.

Cylinders, consisting principally of Airco oxygen and Commercial acetylene, were carried on rolling steel scaffolds (Chesebro Whitman) or in hand carts, three oxygen bottles being hooked up to one manifold to eliminate loss of time in changing cylinders. Carts ordinarily carried a reserve bottle of oxygen to forestall delay in burning while fresh cylinders were being supplied.

A total of about 80 ironworkers and 100 wreckers, assisted by a large force of laborers, worked on the stripping and wrecking operations. Ahead of the stripping cranes, a force of about 200 workmen prepared track and stations by removing spikes, handrail and miscellaneous scrap.

Dismantled steel was placed on truck-trailer units by the cranes and was hauled to the Hudson River for loading on lighters. Concrete-incased column stubs and small station scrap went to the New Jersey yard of the Schiavone-Bonomo Corp., purchaser of all the metal, but the great bulk of the steel was transshipped to railroad cars on the New Jersey shore for eventual delivery to Pennsylvania steel mills.

### Safety Precautions

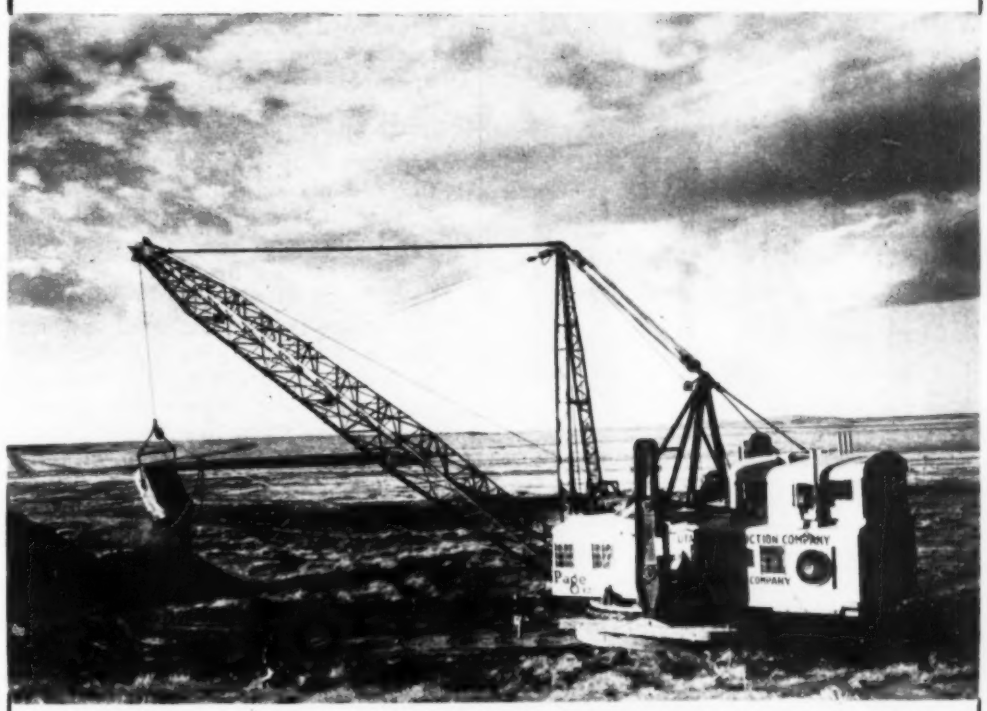
Throughout the demolition process, buses continued to travel under or alongside the El structure for a distance of 5 mi. from 14th St. to 110th St. Intersecting streets were kept open to traffic at practically all times, and detours of traffic in the street directly under the El itself were held to a minimum, the street being closed to vehicle movements for only two or three blocks immediately in the working area of the wrecking crews. Sidewalks were kept open except for brief intervals when steel was being lowered from overhead.

From 50 to 60 flagmen working with the stripping and wrecking crews handled the traffic through the danger spots without accident to any vehicle or pedestrian. Flagmen for the bus companies cooperated with the contractor's guards. Only three intersecting streets were actually closed to traffic for more than a few minutes. These three streets carried car tracks, and the contractor was permitted to interrupt vehicular and street car movements at the intersection for several hours in the dark-

*(Continued on page 100)*


# PAGE TWO-ENGINE DIESEL-POWERED WALKING DRAGLINE

**One engine for loading and hoisting**
**Another separate engine for swinging**



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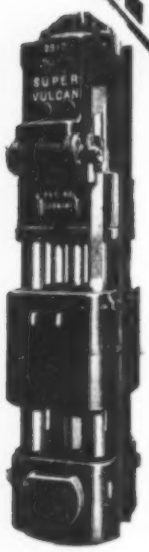

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**VULCAN IRON WORKS** Since 1852
331 North Bell Avenue
Chicago Illinois


*(Continued from page 99)*

ness of early Sunday morning or of a holiday.

Lead fumes produced by flame-cutting of painted steel offered the most insidious menace to workmen on the job. Although no requirements to take care of this hazard are specified by law, the contracting firm followed its established policy of cooperating closely with the State Department of Labor and, after several conferences with the Labor Department, put into effect recommended practices to safeguard burners against the danger of lead poisoning. Prior to employment for this work, burners and ironworkers qualified to act as burners were given an extensive series of blood and urine tests which included examination of blood stipplings for lead in the cells and urinalyses by various approved methods to determine lead content. The tests indicated that some of the men should not be allowed to continue burning lead, and these men were transferred to other work. The men accepted for burning steel were protected by respirators when working and were given periodic tests to make sure that no dangerous condition would go undetected.

Three types of Mine Safety Appliances respirators were used by the burners. The respirator which proved most popular with the men and most convenient for the contractor, despite its higher first cost and maintenance expense, was a canister type (illustrated by a photograph). On the basis of experience on this job, the canister type is the one which the contractor and most of the burners would prefer to use on future work.

**MOST POPULAR RESPIRATOR ON JOB** is canister type which supplies air to rubber face mask through flexible rubber hose from small can, strapped on back, containing replaceable filter and chemical absorbent. When cutting painted steel, burner adjusts mask to cover nose, mouth and lower part of face as protection against inhalation of lead fumes.

Each unit consisted of a canister strapped on the back of the workman and connected by a flexible rubber tube to a mask covering the nose and the lower part of the face. The canister contained a filter ordinarily changed every day and a chemical absorbent changed every second day. A burner could quickly detect any failure of the filter and absorbent by the presence of turpentine or tung oil fumes in the incoming air or by a feeling of personal discomfort; in such an event the filter elements were changed instantly.

Having heard of difficulties encountered in persuading burners to wear any type of mask, the contractor asked for suggestions from the men when they were hired. A number spoke favorably of the air line respirator previously used by them on other jobs; this type is supplied with air at low velocity through large-diameter flexible tube from a small portable compressor. An air line outfit was provided for one of the gangs burning ahead of the cranes, where the compressor could be set in semi-permanent locations. Various reactions were obtained from the men using the air line respirator. Some preferred it to any other type and found that it produced a huge appetite. Others experienced dizziness and nausea, perhaps from the fumes of the gasoline engine driving the compressor, although the engine was well separated from the air intake. A number of the men could not use the air line equipment with comfort, some feeling that it supplied too much air and others not enough. When anybody happened to step on the hose, the burner had to remove the mask from his face. Despite these criticisms from certain workers, the air line mask gave great satisfaction to those who used it continually.

A third type, used by burners working ahead of the cranes, was the Comfo metal fume respirator, a mechanical filter-type unit equipped with twin side-placed filters on a rubber mask covering the nose, mouth and the lower part of the face. The filters, replaced at regular intervals or as required, are designed to give high filtering efficiency against fine metal fumes with minimum breathing resistance. Purchase of these respirators was dictated in part by the exigencies of national defense, as defense orders prevented the manufacturer from making immediate delivery of the required number of canister-type masks. The twin-filter type proved entirely satisfactory.

### Procedure and Progress

As indicated by the preceding notes, the demolition process comprised: (1) stripping deck structure and track, (2) wrecking steel frame, (3) removing columns, and (4) replacing street pavement over column piers. Accompanying photographs illustrate details of the first three phases; a subcontractor took care of the paving operations.

For practically its entire length the El was three tracks wide; the width increased to four tracks for a distance of less than ½ mi. at each end of the line. Steel rail in the tracks totaled 7,000 tons in weight.

Length of panels between bents varied from 35 to 60 ft., and weights of the double latticed girders ranged from about 6 to 10 tons. Normal clearance under the structure was 14 ft., with the top of the girders about 18 ft. above the street. The heaviest girders were at the 53rd St. intersection, where the demolished Sixth

Ave. El joined the Ninth Ave. line. These girders, 95 ft. long, weighed 25 tons each. In 110th St., where the crawler crane operated on the deck, the station platform was 60 ft. above the street, and king post trusses on the tall bents weighed 20 tons each.

A single wrecking crew removed as much as 250 tons of steel frame in one day. Individual performances of the six wrecking outfits, equipped with heavy cranes, ranged from 125 tons to the maximum of 250 tons per day. As previously noted, the required minimum per day to satisfy the contract completion date was 700 tons.

**CYLINDER CART** is fitted with five apertures to carry one acetylene tank and four oxygen bottles. Under ordinary operating conditions, three oxygen bottles are hooked up to one manifold, and fourth bottle is carried as a spare to avoid delay in burning while cylinders are being changed.

As a preliminary to straight El wrecking, two of the heavy cranes worked on large express stations, including the one at 66th St., just north of the crossing over Broadway. Lighter stations were taken down by the column crane in its progress through the job.

El spans over Broadway and 125th St. were removed in the early hours of Sunday mornings, the work starting at midnight, and the 42nd St. crossing was taken down on a Sunday, Nov. 10, and on the following Armistice Day holiday, Monday, Nov. 11. The contractor was permitted to shut off all traffic, including street cars, under the El for 8 hr. at each of these locations.

### Administration

For the Board of Transportation of the City of New York, demolition of the Ninth Ave. elevated railway line was directed by Louis E. Robbe, division engineer, with Charles M. Madden, assistant engineer, in charge in the field, assisted by R. B. Hammond on the north half of the project and by William B. Maher on the south half. Operations of the Albert A. Volk Co. were under the general direction of A. K. Fleschner, president, and Michael Sheriff, treasurer, with John A. Rutan, engineer, carrying field responsibility for successful execution of the demolition work on the 10-mi. structure.


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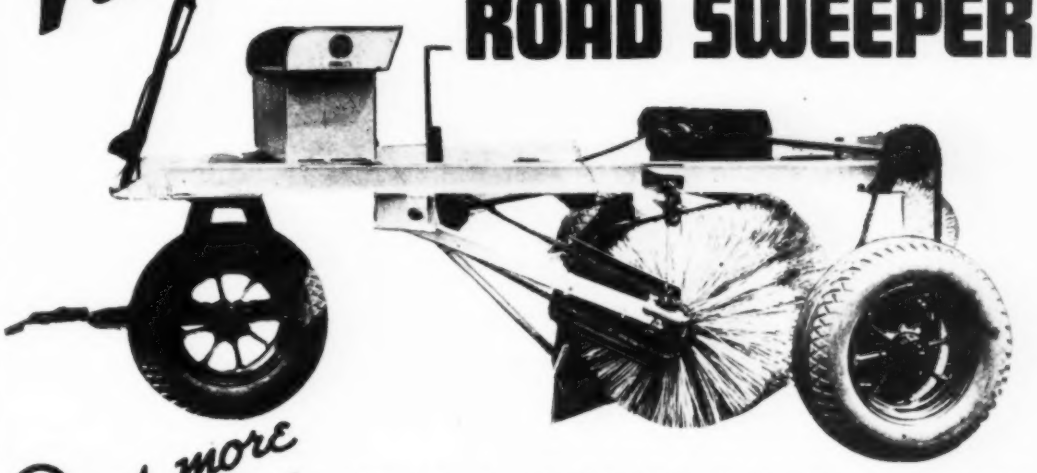

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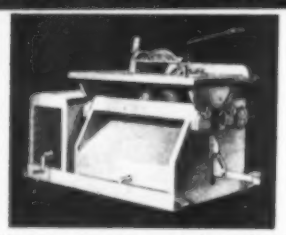

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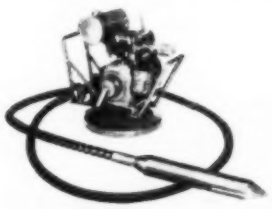

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**An Advertising inch** is measured ⅞" vertically on one column, 4 columns—48 inches—to a page.

NEW ADVERTISEMENTS received by February 19th will appear in the March issue, subject to limitations of space available.

## NEED DUMP CARS?
**FOR SALE**
**215**

20 and 30-yard Capacity All-Steel
Clark, Magor, Koppel and Western
Both Up-turning and Down-turning Door Types

## IMMEDIATE DELIVERY!

All Priced to Move Quickly • Buy Now or Anticipate Future Requirements Now • Later on You May Have to Wait 6 Months for Delivery • A Truly Unusual Opportunity • Just Obtain Our Quotations • Send for Illustrated Bulletins

Other Types of Cars, Too Also Locomotives, Cranes, Shovels, Etc.

**IRON & STEEL PRODUCTS, INC.**
36 YEARS EXPERIENCE
**13458 S. BRAINARD AVE. CHICAGO, ILLINOIS**
*"Anything containing IRON or STEEL"*

**FOR THE INDEX TO ADVERTISERS IN THIS ISSUE SEE PAGE 70**

● One wire rope looks pretty much like another. But some ropes stand up better than others and make your buying money go farther. You can't *guess* what different ropes will do but you can easily keep a performance record. . . . Then you'll *know* what service your rope gives—how many hours or tons of work—how often replaced—and how much time lost for replacement. In short, you'll know exactly what you get for what you pay. . . . American Cable TRU-LAY Preformed Wire Rope shows up exceptionally well in comparative performance tests. It spools even, it handles easy, it reeves fast. Thanks to the preforming we give it. Yes, we like performance tests on TRU-LAY Preformed because they prove this rope extremely economical. . . . Write today for a supply of WIRE ROPE SERVICE RECORD FORMS. They are free. Their use will help increase production and lower costs. They are free of cost and obligation—and may be used with any type or make of wire rope. Prove to yourself that American Cable TRU-LAY Preformed is even *better* than we claim.

**AMERICAN CABLE DIVISION** • WILKES-BARRE, PENNSYLVANIA

District Offices: Atlanta, Chicago, Detroit, Denver, Los Angeles, New York, Philadelphia, Pittsburgh, Houston, San Francisco

**AMERICAN CHAIN & CABLE COMPANY, Inc.**

**ESSENTIAL PRODUCTS** . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

Tapered Roller
TIMKEN BEARING
EQUIPPED

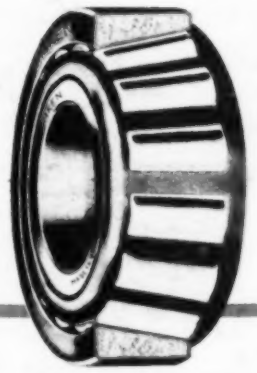
# Concrete where you want it-

# When you want it.....

Blaw-Knox Trukmixers are important units of speed and economy in road construction . . . and TIMKEN Bearings are important units of speed and economy in Blaw-Knox Trukmixers.

They are applied to the mixing drum rollers to keep the drums turning smoothly and steadily; to counter the threats of radial, thrust and combined loads; to save power, reduce lubrication and cut maintenance cost.

It takes tremendous strength and endurance to keep anti-friction bearings operating successfully in modern road construction equipment. That's why TIMKEN Tapered Roller Bearings are the rule in power shovels, draglines, scrapers, graders, concrete mixers, pavers, hoists, dirt movers and other machines. Specify "Timken Bearing Equipped" when buying.



**TIMKEN**
***TAPERED ROLLER BEARINGS***

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.

**THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO**